



# NetworkWorld

The leader in network knowledge

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September 18, 2000 Volume 17, Number 38

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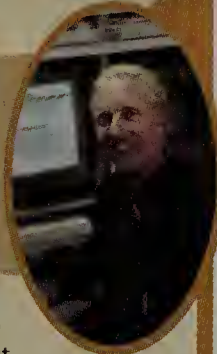
## disk duty

**Feature:** Defragmenting hard drives across your network is anything but sexy. However, IDC says companies can save \$50 billion per year by using remote defrag software. **Page 60**

**Feature:** Most network executives would rather throw bandwidth at their traffic woes than try to implement a complex bandwidth allocation scheme. But Longs Drug Stores went the QoS route and couldn't be more pleased with the result. **Page 65**



**Feature:** Want the inside scoop on frame relay pricing? Check out our Telecom Tracker. **Page 69**



## Advances could spell faster DSL delivery

BY MICHAEL MARTIN  
AND TIM GREENE

Companies and teleworkers may see their DSL orders fulfilled faster thanks to a raft of new provisioning tools and stronger ties between DSL providers and incumbent local exchange carriers.

While DSL deployment is booming — consultancy TeleChoice counts 1.2 million lines in the U.S. as of July 1, up 59% in only three months — DSL orders can still take weeks to fulfill.

DSL providers and the ven-

dors that supply them are trying to reduce these delays. Provisioning tools unveiled last week that should speed up the See **DSL** page 108

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Get up-to-the-minute DSL news and resources with our DSL research center.



## Win 2000 Datacenter aims to dethrone Unix

*Users react cautiously to Microsoft's latest offering.*

BY JOHN FONTANA

REDMOND, WASH. — Microsoft's release next week of Windows 2000 Datacenter will mark the software giant's most ambitious attempt to penetrate the corporate glass house.

Whether Datacenter has the weight to break through remains anyone's guess. But the attempt will undoubtedly mark a major change in the way Microsoft and its partners deliver software and hardware.

The development may also eventually let IT executives reevaluate network operating system choices and server deployments. That reevaluation process, however, won't come without painstaking

### Windows 2000 family

Microsoft this year has rolled out three classes of Win 2000 servers.



Feature	Windows 2000 Server	Windows 2000 Advanced Server	Windows 2000 Datacenter Server
Processor limit	4	8	32
Memory support	4G bytes	8G bytes	64G bytes
Network load balancing	No	Yes (maximum 32 nodes)	Yes (maximum 32 nodes)
Server clustering	No	Yes (maximum 2 nodes)	Yes (maximum 4 nodes)

NOTE: THERE IS NO UPGRADE PATH FROM ADVANCED SERVER TO DATACENTER

tests to prove Datacenter is worthy to host core enterprise systems.

Datacenter is Microsoft's

attempt to compete with long-established, midrange Unix and minicomputer systems that run See **Datacenter** page 106

## Genome Project meets Gigabit Ethernet

*Incyte fashions high-speed network to support historic scientific endeavor.*

BY JIM DUFFY

PALO ALTO — When completed this summer, a "working draft" of the human genome was hailed as a major milestone in the efforts to combat illness and disease by better understanding the genetic makeup of the human body.

For one company, the project also provided insight into how a fully redundant, meshed Gigabit Ethernet network can



hold up through the strain of decoding strands of human DNA.

Incyte Genomics relied on its Gigabit Ethernet network to provide DNA sequencing information for the Human Genome Project as well as for private medical and pharmaceutical companies. This data is useful not only for information on the human genetic code, but also for research on drugs to better

See **Incyte**, page 108



Incyte's Phil Kwan says Gigabit Ethernet has proven reliable.



# Look No Sea

## New ARCserve® 2000 Offers Serverless Backup And Re

It couldn't have come at a better time. With eBusiness storage needs typically doubling every 18 months, and the growing demand for 100% uptime and availability of servers, IT administrators are facing ever-greater challenges.

New ARCserve® 2000 is the answer. SAN environments are becoming increasingly popular as businesses recognize the importance of a separate storage management infrastructure. With serverless

# Ma, rver.

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backup and restore, ARCserve 2000 represents a major breakthrough in data storage. With SAN, there are several new industry-leading capabilities like shared tape libraries and high-speed data transfer.

ARCserve 2000 leverages industry standards for assured compatibility with incredibly easy implementation. It offers the first scalable, proven enterprise-class data protection that's really easy to use.

The new Web-based GUI delivers the power to manage far-flung data backup and recovery operations from a single location. And disaster recovery can be as simple as a single step.

High performance, industry standards, easy to use, and unprecedented value. Just a couple of reasons why new ARCserve 2000 is the best storage solution for the eBusiness revolution.

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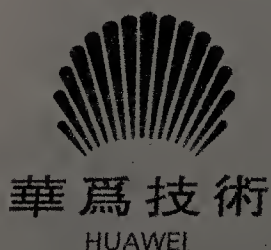
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# NetworkWorld

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## MARKET INSIGHTS IP PBXs

### Review

*This time last year, the average IP PBX topped out at 100 end users. Our exclusive Mier Communications/Network World survey reveals that the latest generation of IP PBXs scales into the thousands of users and offers features comparable to traditional PBXs. Page 73.*

### Review

*HP's NetServer LT6000r pushes the performance envelope. Page 79.*



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### WEBCASTS

#### Storage: A LAN of its own?

On next month's Networked World, join experts to discuss whether you need a separate LAN for just your storage traffic. Will it prevent logjams from requests and backups across your main network? What's the best option for your company? Register now for the live Webcast, airing Oct. 6 at 1 p.m. EST. **DocFinder: 9932**

#### ADS vs. NDS

Which directory strategy should you embrace: Novell's or Microsoft's? Experts from both companies battled it out for your vote. Find out what the outcome was, and hear Net Buzz author Paul McNamara's take on firing employees for e-mail and Internet abuse. **DocFinder: 9933**

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### BARNEY'S RUBBLE

*The best of the NetFlash daily newsletter*



#### Japanese dentist develops electronic tooth

Sometimes a story is so wacky that it doesn't matter whether it has a network angle or not — we cover it anyway. It seems a Japanese dentist discovered a huge problem. Dentures in nursing homes were getting misplaced and mixed up. And there is nothing more uncomfortable than having someone else's wet choppers in your mouth. So Hisashi Kishigami came up with a way to put a chip in a false tooth that can identify the denture owner. **DocFinder: 9941**

#### Computers called 'fool's gold' for students

I have been a vocal but thoroughly ineffective advocate for computers in low-income schools and developing nations. The idea is that computer skills are essential in today's economy, and the haves have a huge advantage over the have-nots when it comes to technology. A child advocacy organization thinks I'm all wet. In fact, it argues that computers harm the learning process and create overweight, socially inept kids with carpal tunnel. Hey, I've got all those attributes, and I didn't even use a PC till I was 22!

What do you think? Are PCs bad for kids? Write me at netflash@nww.com. **DocFinder: 9942**

#### Federal security misses the mark

Looking for an easy place to hack? According to the U.S. federal government, an easy target is — the U.S. federal government. According to a recent survey, government agencies get a D- for security — even worse than I did in algebra. Let the hacking begin. **DocFinder: 9944**

— Doug Barney, executive editor, news

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### COLUMNISTS

#### The Bleeding Edge

*Internet tax evasion?*

Don't be surprised if service providers start locating servers on tax-free sites such as American Indian reservations and churches, say TeleChoice's Daniel Briere and Beth Gage. **DocFinder: 9936**



#### Keeping Current

*Faster isn't always better*

OC-768 over SONET just sounds way cool. But Fred McClimans isn't so sanguine. **DocFinder: 9937**



#### View from The Edge

*Building access*

Access rules are only part of the building entry game, as the FCC discussed last week, says Managing Editor David Rohde. **DocFinder: 9938**





## NEWS BRIEFS, SEPTEMBER 18, 2000

**Cisco 6000 set for upgrade**

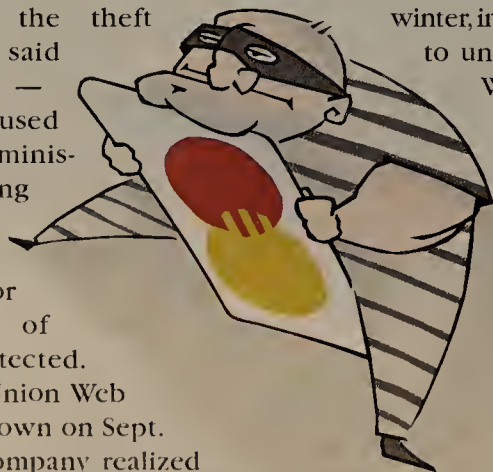
Cisco this week is expected to upgrade its Catalyst 6000 LAN switch line with a new switch management module, routing card and line cards. The Supervisor II switch management engine will enable the Catalyst 6500 to perform distributed switching of 30 million to 150 million packet/sec for IP and IP multicasting, sources say. New line cards for the switch will essentially mimic the backplane design of the chassis by including a localized crossbar switching fabric and a 32G bit/sec local bus. The Multilayer Switching Feature Card 2 (MSFC2) will be a daughtercard for the switch's Supervisor 1A engine, which provides Cisco IOS-based multiprotocol routing for the Catalyst 6000 line. MSFC2 quadruples the control plane performance of the previous-generation MSFC. Cisco declined to comment.

**Visa takes wraps off smart card**

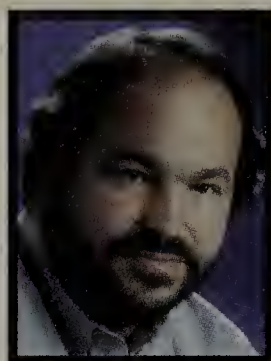
Visa International last week unveiled a smart card product called Smart Visa that includes 32K bytes of memory for multi-purpose e-commerce applications in addition to the more-common magnetic-strip credit card processing functionality. Based on the GemPlus card design, Smart Visa includes a prepackaged suite of applications for credit- and debit-payment processing, and a so-called loyalty application developed with help from Logicon and Smart Dynamics for awarding customer usage bonuses. Three banks — Provident Financial, Fleet Boston and FirstUSA — plan to issue Smart Visa to customers. The card, built to meet smart card specifications set by the General Services Administration, can also be used to provide access to buildings and networks.

**Hackers hit Western Union**

Western Union last week admitted that unknown hackers broke into its Web site, and stole 15,700 Visa and MasterCard credit card numbers from customers who had purchased Western Union money orders online. Western Union declined to explain exactly how the theft occurred, but said human error — unwittingly caused by system administrators during routine maintenance — was to blame for leaving parts of the site unprotected. The Western Union Web site was shut down on Sept. 10 after the company realized it had been compromised, which brought online sales to an abrupt halt — at least for now.

**Microsoft's Maritz to retire**

Paul Maritz, vice president of Microsoft's platforms strategy and developer group, is retiring after 14 years. Maritz will act as a consultant for the company on strategic and business issues. Maritz has recently been working with the developers of Microsoft's new .Net initiative, and has been involved with Windows and Office projects. Maritz's departure has been in the works since July of last year,



Paul Maritz is calling it quits at Microsoft.

when Microsoft announced that he would be taking a step back from day-to-day operational duties. That move came after a number of high-profile Microsoft executives had either left the company or lessened their level of responsibility.

Maritz was Microsoft's first employee to take the witness stand in its defense against the U.S. government's antitrust allegations.

**B2B exchange gets nod from FTC**

Covisint, the business-to-business exchange started more than a year ago by automakers General Motors, Ford and DaimlerChrysler, last week gained tentative regulatory approval from the Federal Trade Commission (FTC), which has been scrutinizing the business-to-business exchange on antitrust grounds even before it has begun operation. The FTC said that Covisint could start processing trades between auto industry suppliers and automakers but warned that further investigation may occur. Covisint officials are still struggling to gain approval from European regulators, and don't expect to begin operation until year-end.

**Attacking DDoS attacks**

A group of large companies struck by massive distributed denial-of-service attacks last winter, including Yahoo and eBay, is expected to unveil a plan next week at the NetWorld+Interop show to get ISPs and Web hosting firms to work together to prevent such attacks and do a better job of identifying the attackers. The group will lay out a plan for the service providers to install intrusion-detection gear that will make it easier for them to share data and coordinate efforts. Distributed denial-of-service attacks typically arrive via several ISP networks, so coordination among service providers could be key to stopping and responding to attacks.

# New tools coming to manage handhelds

BY JOHN COX

Help appears on the way for network executives looking to get a grip on the management of handheld devices.

Mobile Automation this week is releasing Mobile Automation 2000 (MA 2000), Web-based programs that give managers tools for controlling handhelds, laptops and remote PCs.

At the same time, management vendors such as Computer Associates, Hewlett-Packard and Tivoli are readying new or improved products aimed at wireless devices. Microsoft is also extending its Windows Management Instrumentation (WMI) specifications and APIs (formerly called Web-based Enterprise Management) to Windows CE 3.0, its main platform for the mobile market. WMI acts as a set of standards — now being fostered by the Distributed Management Task Force — for sharing management information among hardware components and applications.

Mobile Automation's product includes a set of server programs that run on Windows NT and 2000, and client programs called agents that are downloaded to handhelds running Windows, Windows CE and Palm OS. The vendor is testing a client for Research In Motion's BlackBerry interactive pager.

Using the server software and a Windows client or a Web browser, administrators can, among other things, set up automatic software downloads to handhelds, remotely configure them and automatically collect some information from them about the specifics of the devices and their software.

MA 2000 "sees" the handhelds when they are plugged into the network by putting the device into its cradle, or attaching through a wireless Ethernet card or modem. Agents can set up interactions with server programs, letting MA 2000 change configurations or update software without actions by the end user.

One beta tester is Unigraphics Solutions, a St. Louis maker

of high-end CAD/CAM software. The company is using MA 2000 to manage about 1,600 desktops. There are also about 250 handhelds throughout the global company, and these will be covered later by the MA 2000 umbrella, says Brian McEvoy, senior director for global business desktops.

As with desktops, McEvoy will want to inventory handhelds, push out mandatory software upgrades to them, and distribute optional software to groups or individuals. MA 2000 is simpler and needs less programming than two other management products Unigraphics evaluated, he says.

MA 2000 stores data about the clients in a relational database. The data is easy to query and combine with data from corporate asset management applications and other data sources, McEvoy says. Also included is an interface that lets MA 2000 collect data from Lightweight Directory Access Protocol servers, and correlate this data with its own.

MA 2000 is available now for \$4,995 per server, \$45 per Windows CE device and \$19 per Palm OS device.

The market for mobile management is teeming with activity, drawing newcomers such as Mobile Automation and spurring new offerings from major players such as CA and Tivoli, as well as innovative rivals such as Aprisma Management Technologies.

CA recently integrated two management programs into its Unicenter TNG platform, one for software distribution, the other for inventorying software; they were separate applications (see story, Page 18).

In April, Unicenter incorporated support for Microsoft Windows CE 3.0, the operating system for an array of new handhelds from computer manufacturers.

CA will unveil additional software for managing wireless nets and devices during the next two months, says Allen Andersen, vice president of enterprise management. Andersen says areas being targeted

See **Mobile**, page 106



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# New providers to wholesale VPN services

*The result could be more choices for customers buying managed VPN services.*

BY TIM GREENE

**BOSTON** — A new breed of service provider promises to give customers more choices when buying fully managed VPN services.

The service providers' spin is that they don't sell directly to enterprises; they sell to other service providers that sell to enterprise customers, who can benefit from the low cost and ubiquity of the Internet to create secure corporate networks.

The value for established providers is that they can offer a VPN service without making a capital investment. They pay a fixed monthly fee per end user that can be less than \$10 per month. As a result, more service providers are likely to

sell managed VPN services.

These new companies — e-Tunnels, mVPN and OpenReach — were trying to drum up service provider customers last week at the VPNCon conference in Boston.

While these companies are just coming out of the gates, they carry a significant handicap, according to Ron Westfall, an analyst with Current Analysis, a market research firm in Sterling, Va. The reseller arrangement inherently means two providers are involved, leading to potential delays fixing problems when something goes wrong.

While these services could potentially take the pain out of VPNs, cautious end users will have trouble letting go of their VPN security.

"It depends on how comfortable you are about outsourcing. For me, there's a lot of trepidation about handing anybody the keys to the kingdom," says Paul Forbes, network engineer for Trimble Navigation. The Sunnyvale, Calif., company has an international VPN it manages itself.

Based on his experience, Forbes says he is skeptical that service providers can deliver VPNs without significant glitches. "VPNs are not plug-and-play. They're not even close," he says.

E-Tunnels sells VPN-On-Demand, a service that ISPs, for instance, could resell to customers. E-Tunnel's software would be downloaded to PCs and servers designated as VPN gateways in the net-

works of an ISP's customers. Internet-connected servers in e-Tunnel's network would then set up and tear down secure IP tunnels among customer machines.

In addition to managing the tunnels, the e-Tunnel servers also manage exchange of encryption keys among devices.

E-Tunnel charges \$10 per ISP customer site per month, and ISPs charge customers whatever markup they want.

MVPN also runs a VPN service for ISPs and other service providers. MVPN distributes VPN gateway hardware made by Cisco to each customer site and deploys software to customer PCs as well. The company also handles distribution of the encryption keys that are used to secure VPN traffic.

OpenReach manages its TrueSpan VPN service through its network operations center. End users must supply PCs at each of their sites that are converted to VPN gateways via a software download from OpenReach. The company is soliciting service providers to market the TrueSpan service branded as its own.

TBD Networks offers service providers a slightly different package.

TBD sells VPN service creation and management software called Service Commander that is integrated with equipment made by multiple VPN equipment makers. Providers can then use it to plan, deploy, run and manage customer VPNs. ■

## VPNs

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# CoreExpress set to let loose managed VPN service

BY DENISE PAPPALARDO

**ATLANTA** — CoreExpress is launching its guaranteed, managed VPN service next week at NetWorld+Interop 2000 that will let users set up extranets across multiple ISP networks.

The CoreExpress Extranet service will let users securely exchange IP traffic between multiple locations regardless of which service provider they use. The start-up, which was launched in May, is getting under way with its network

deployment and service trial.

CoreExpress is building a network called the Internet Data Exchange System, which reaches nine cities. Four of the largest U.S. ISPs — AT&T, Genuity, Sprint and UUNET — are connected to the CoreExpress network, which gives CoreExpress access to 88% of all enterprise users that buy dedicated Internet access services, says Mike Gaddis, CEO at the start-up.

The service lets users set up VPNs that aren't restricted to a single service provider's net-

work while gaining more predictable performance. In addition, customers can monitor their VPN in real time with computers that are deployed at each VPN location and are equipped with CoreExpress' Extranet Viewer software.

"Data is collected from the computers segment by segment and stored in a database at CoreExpress," Gaddis says. The monitoring tool allows users to view the status of the entire VPN from end to end or by specific links. "The monitoring software



offers users a view into their carrier's network that is not available today from other service providers," says Alex Benik, an analyst at Boston consulting firm The Yankee Group.

While some service providers offer customers access to Web sites that report network statistics, ISPs don't offer tools that let users see their entire VPN, says David Willis, program director at Meta Group, a consultancy in Stamford, Conn.

On the downside, while its Extranet software lets users closely monitor service-level agreements (SLA), CoreExpress has not yet detailed the SLAs it will offer.

The SLAs will be announced in January when the Extranet service is available, and customers have been testing the network for some time, says Gregory Davis, vice president of marketing and product management at the company. But Davis says CoreExpress will at a minimum support industry

SLAs such as 99.9% network availability, packet loss of no more than 1% and low latency of no more than 120 msec to 150 msec.

In addition to fine tuning its SLAs and network monitoring technology, CoreExpress has also been lighting its fiber-optic network. The network is up and running in Atlanta, Chicago, Denver, Dallas, Herndon, Va., Los Angeles, New York, Santa Clara and St. Louis. The service provider will have five OC-192 fiber rings, totaling 22,000 route fiber miles, in operation by mid-2001, Gaddis says. The start-up plans on linking Boston, Miami, Phoenix, Salt Lake City and Seattle in the first quarter of 2001.

CoreExpress' network will be a differentiator for the start-up as more service providers such as SmartPipes and QoS Networks launch service offerings. In fact, both companies are expected to announce the start of beta trials next week at Interop.

Analysts agree that users want more control over their IP VPNs, but one question that's still not answered is how much users will have to pay for that control. CoreExpress says it's still working on pricing and will have rates available early next year after its beta tests are complete.

CoreExpress: [www.core-express.com](http://www.core-express.com)

**An end-to-end look**

The CoreExpress Extranet Viewer performance monitoring tool lets users view from the edge of their VPN to the edge of each location connected to the VPN in real time. Users can also zero in on their connection directly to the core of the network.



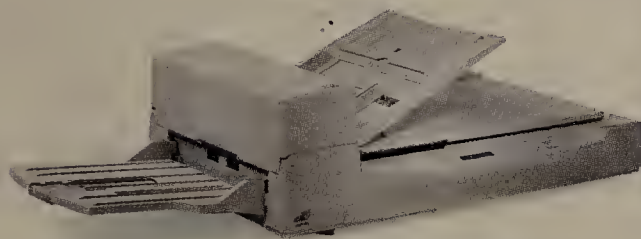
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# AOL woos small businesses with e-comm plan

*Netbusiness portal offers e-business cards, Web-hosting service for free.*

BY ELLEN MESSMER

SAN JOSE — AOL last week invited small businesses to get into e-commerce by using an array of offerings — many of them free, such as online calendaring — available via the company's new Netscape Netbusiness service.

Many small businesses don't have Web sites, much less process transactions online. But AOL, with its Netbusiness portal, hopes to coax small-business managers into e-commerce through a low-tech approach.

Initially, businesses can start

off with an electronic business card, which small-business managers are asked to create at the AOL Netbusiness

the first cornerstone for the online storefront.

The card information can be e-mailed and used in

■ **"Only 37% of small businesses are online today, but the rest want to go online."**

Frederick Singer, general manager, Netscape Netbusiness

site (AOL.com, keyword: Netbusiness or at [www.netscape.netbusiness.com](http://www.netscape.netbusiness.com)). This card, which can include a photo and details about the business, is an identifier that lays

instant-messaging forums dedicated to business topics on AOL chat rooms. AOL will also list the information on each Netscape Netbusiness card for free in service marketplace

directories, as well as on Internet-based Yellow Pages and other search directories.

"There are 28 million businesses in the U.S. with less than 10 employees," says Frederick Singer, an AOL executive who is overseeing Netbusiness, which was introduced at the Internet Commerce Expo in San Jose. These small businesses employ about half of the working population and generate almost half of all U.S. sales, but Singer says almost three-quarters of these businesses aren't yet active on the Web.

AOL's strategy to capture

this small-business mind share in a big way entails offering a slew of free services augmented by paid-for services — such as credit card processing — that will be provided by AOL's partners.

Start-up Bigstep.com, for instance, is an AOL Netbusiness partner that will provide free Web-page hosting and catalog support. Bigstep.com charges for credit card processing and other commerce services. One Bigstep.com customer is The Foot Nurse, a Cupertino, Calif., podiatry healthcare business owned by registered nurse Patti Glick. She says the \$25 per month she pays to use several BigStep.com services is reasonable.

"I researched this a lot as I started my own business," Glick says, adding she sells diabetic test kits online with purchase orders e-mailed to her and credit cards cleared through BigStep.

If they want to try e-procurement, Netbusiness users will be able to purchase office supplies and other goods at AOL via PurchasePro.com, which aggregates customer orders to get better deals.

Initially, AOL expects to earn most of its Netbusiness revenue through advertising but will share a percentage of profits that its partners earn selling e-commerce services at Netbusiness. ■

## Intel rolls out enterprise LAN access security cards

*Company's Pro/100 S family of cards support IPsec in Windows 98, NT 4.0 and 2000 machines.*

BY APRIL JACOBS

FRAMINGHAM, MASS. — Intel this week will roll out three secure LAN adapter security cards that promise to help customers simply and inexpensively provide data security across their networks.

The Pro/100 S family of security cards can also help boost performance on desktops, laptops and servers because they have a coprocessor that handles all encryption- and decryption-related functions. These functions would otherwise be handled by the computer's main processor if it were using a software-based encryption technology.

Intel says the PCI-based card supports multiple operating systems, such as Windows 98, NT 4.0 and 2000, and supports the IP Security standard, which previously only supported Win 2000. Customers can also use the cards to encrypt data that goes over the Internet to remote and branch offices using a VPN.

The cards work by encrypting data as it leaves the laptop, PC or server, which is

then decrypted upon reaching its destination. In addition to supporting standard 10M bit/sec Ethernet network connections, Intel is supporting Fast Ethernet network connections at no extra cost.

access to a company LAN account for about 55% of security breaks, according to a recent FBI/CSI Computer Crime and Security survey.

At Pyxis, a San Diego company that provides security,

cards encrypt information between the stations and RX Systems 2000 database consoles that contain vital — and highly confidential — patient information. Matthews says patient information is called up by medical staff when drugs are dispensed to provide billing and inventory information and ensure that patients don't receive medication that they shouldn't.

Pyxis is installing the cards as one measure to help its customers get ready to comply with privacy standards that will have to be met during the next few years as mandated by the federal Health and Human Services Department.

The cards also let customers use management tools such as Alert-on-LAN 2.0, Wake-on-LAN and Wired for Management 2.0. The integrated management coprocessor enables easier remote configuration and management of laptops and desktops, even when the operating system is down.

The new Pro/100 S family of cards for laptops, desktops and servers will be available in October for \$269, \$97 and \$119 each, respectively.

Intel: [www.intel.com](http://www.intel.com)

### Boosting LAN management

**Intel's LAN security adapter cards are embedded with multiple layer security features:**


- Enabling systems using the Microsoft Windows 98 or NT 4.0 operating system to utilize IP Security, previously limited only to systems using the Windows 2000 operating system.
- Protecting information as it travels across the LAN, rendering it unreadable to hackers "sniffing" the network.
- Integrating advanced management capabilities such as Alert-on-LAN 2.0, Wake-on-LAN and Wired for Management 2.0.

In the hardware-based security card business, Intel competes with 3Com, which offers desktop and server security cards, but not laptop cards.

Intel's Tim Dunn, general manager of the company's LAN Access Division, says he expects the cards to be used to prevent security breaches inside and outside a company's network. Dunn notes that corporate users with

billing and inventory systems to hospitals and pharmacies worldwide, the cards are being tested as a way to secure patient information and help account for the drugs they receive.

Rod Matthews, network systems specialist for Pyxis, says the company has installed the cards on two workstations in the hospital wards and on the database consoles networked to those workstations. The



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**This week's question:**

What was Compaq CEO Michael Capellas' title when he joined the company two years ago?

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# Enterprise apps and services top Internet show

BY CAROLYN DUFFY  
MARSAN

SAN MATEO, CALIF — Corporate IT managers can look for new Web search and navigation tools, content syndication software and managed network services from start-ups that were showcased at a conference for venture capitalists and Internet entrepreneurs in San Mateo last week.

The Internet Outlook conference provides a forum for 100 CEOs from emerging companies to give short presentations about their business plans. The audience and a panel of venture capitalists select the 10 most promising start-ups at the end of the conference.

This year's list of winners features eight companies planning to offer enterprise applications and services (see graphic).

Only two consumer-oriented Web sites were selected: Kmart's BlueLight.com, which offers free Internet access and online shopping; and Vividence, which pays consumers to conduct Web-site testing and sells the results back to Web-

## 10 Internet start-ups to watch

Enterprise applications and services dominated the Internet Outlook Show last week. These companies were among those featured:

Name	Description
<b>BlueLight.com</b>	Free Internet access and online shopping.
<b>DoDots</b>	Application for viewing online information without a browser.
<b>FireDrop</b>	Technology for interactive e-mail.
<b>Google</b>	Internet search engine with enterprise version.
<b>GuruNet</b>	Browserless Web information retrieval system.
<b>ISyndicate</b>	Internet content syndication service.
<b>Octopus.com</b>	Customized Internet navigation tool.
<b>Responsys.com</b>	Web-based marketing automation services.
<b>Vitessa</b>	Hosted transaction and site management services.
<b>Vividence</b>	Pays consumers to test Web sites.

site operators.

The lack of interest in business-to-consumer Web sites and business-to-business Internet exchanges at the conference corresponds with a dramatic decline in stock market valuations for these types of companies over the past six months.

"It's hangover time," says Alex

Baluta, a principal with investment banking firm Robertson Stephens who specializes in enterprise applications. "The investment community is much more cautious, but they are willing to invest in enabling technologies."

The trend is good news for corporate IT managers, who

will benefit from the innovation and investment in enterprise-oriented products and services.

Venture capitalists like enterprise applications because they have a reliable customer base and revenue stream vs. the advertising-driven model used by most consumer Web sites. "The eyeball-gathering game has gotten old," says Steve Jurvetson, managing director of Draper Fisher Jurvetson. He says he's interested in start-ups in which the "mere act of using the product generates revenue."

One of the start-ups that Jurvetson and other conference attendees were most excited about is GuruNet, which offers a free desktop software application that gathers information from across the Web to answer end-user questions. Users merely click the "Alt" key while pointing to a word, such as "Luxembourg," to get information about the country's history and location.

"GuruNet is the coolest application, and it demos great," says Stewart Alsop, a general

partner with New Enterprise Associates. "It's really cool to see the integration between what's happening on the computer and the Web. I just haven't figured out how they're going to make money."

That's where the enterprise market fits in, according to GuruNet CEO Eric Tilenius, who says a corporate version of the software is due soon.

Another Web navigation tool that intrigued conference attendees was from Octopus.com, which offers software for putting together personalized metaportals from information sources across the Web. Octopus.com has a consumer service but is eyeing the enterprise market via integration with Oracle and SAP.

Baluta sees value in Octopus.com's ability to create a one-to-one relationship between an end user and the Web, but he questioned the company's ability to sell into the enterprise market.

"This idea won't necessarily carry over into the enterprise application integration area," he says. ▀

# IBM and HP roll out high-end Unix systems, new features

BY APRIL JACOBS

Looking to quench the never-ending need for data center capacity and bandwidth, Hewlett-Packard and IBM are separately rolling out monster servers capable of handling the needs of high-end dot-com and enterprise customers.

HP last week announced its high-end HP 9000 Superdome server, which sports a number of mainframe-like features, such as partitioning. Partitioning will let users slice up the server to handle multiple functions or consolidate complex tasks to a server cluster — reducing the amount of management, configuration and administration associated with distributed network servers. For example, the HP 9000 Superdome can be split into partitions that might handle separate Enterprise Resource

Planning and SAP applications.

Using resource partitioning capabilities, network professionals can use scripts or templates to carve up CPUs and establish policies based on how those processors should be used, says Brad Day, a senior analyst at Giga Information Group in Cambridge, Mass. He says those policies can let customers allot how much CPU power they want to give to certain users and applications.

HP's Superdome systems are available now starting at about \$400,000, according to Nam LaMore, a company spokesman.

HP will also begin offering the Superdome based on Intel's IA 64-bit processors by the end of 2001, with support for Windows 2000 and Linux. Superdome now runs on HP-UX 11.i.

Day says with the announcement of Superdome, HP has a leg up on competi-

tors Sun and IBM because it can also allow for disk I/O partitioning — which lets network managers assign disk I/O resources to specific groups of users and applications. Virtual partitioning allows for moving of applications and resources between partitions. For example, if a network manager discovers that one partition isn't enough for a workload, he can move them as workloads change through an on-the-fly management console.

For its part, IBM announced Blue Hammer, which essentially extends the management capabilities of the company's RS/6000 SP supercomputer to its enterprise Unix offering: the RS/6000 S80 — which supports clusters that range from two 12-way systems to 16 24-way systems. By porting its Parallel System Support Program (PSSP) management software,



The S80-based high-performance cluster system uses IBM's PSSP.

originally designed for the SP, to the S80, IBM provides a set of tools that network managers can use to monitor and control all servers on the cluster from a single console. PSSP software is a powerful set of management tools that lets net managers configure and perform network server tasks from a

single console.

IBM's S80 cluster with PSSP software is available immediately. A base configuration of two six-way clustered S80s — 12 microprocessors — begins at about \$705,000.

IBM says it will have support for PSSP on its midrange systems — the M80 and H80 — by the end of 2001.

High-end Unix servers have become popular packages for serving up e-commerce, Internet and Web-related businesses. Sun is considered the market leader in this realm, with HP and IBM in second and third place respectively. Published reports indicate Sun may try to one-up HP and IBM in the next few weeks with its often-delayed UltraSPARC III chip-based workstations or servers.

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# Vendors to show storage over LANs at N+I

BY DENI CONNOR

EMC, Cisco and Nortel Networks and storage start-ups SAN Valley and 3ware will demonstrate at NetWorld+Interop 2000 in Atlanta next week technologies for routing and switching storage data over Gigabit Ethernet and optical networks for replication, backup and disaster recovery.

With these technologies, users can less expensively join remote storage-area networks (SAN) and send data over IP-based networks to back up networks, replicate data for increased availability and protect systems from downtime.

"By being able to tie SAN islands together and send stor-



age data over IP, users start to approach the global network they thought they were getting when they implemented SANs," says Steve Duplessie, an analyst with Enterprise Storage Group in Milford, Mass.

IP storage start-up SAN Valley will show the SL1000 Gateway, a 1 7/8-in. high rack-mountable device with redundant power and cooling. It uses technology that encapsulates Fibre Channel data in Gigabit Ethernet packets for transport from one remote SAN to another. In a typical con-

figuration, the SAN connects to an SL1000 Gateway via a Fibre Channel switch where it is shunted across the IP-based network to a SAN on the other side. SAN Valley's SL1000 Gateway will conform to the Fibre Channel over IP standard when the American National Standards Institute ratifies it next year, the company claims.

Another technology, iSCSI, which will be finalized by the end of next year, has been adopted by 3ware.

The technology uses iSCSI to transport block storage over Gigabit Ethernet to 3ware Network Storage Units (NSU). The NSUs will also be adapted to transport Fibre Channel data over Gigabit Ethernet. The pro-

posed iSCSI standard is sponsored by Cisco and IBM, and has been submitted to the Internet Engineering Task Force.

In a 3ware configuration, an NSU connects to the Gigabit Ethernet network using a nonblocking packet-switching technology.

Each data block transferred from the host computer has equal access to storage. 3ware's NSU will be upgradable to the iSCSI specification when it is available. Each NSU contains up to 600G bytes of storage. The NSU also has hot-swappable disk and power supplies.

EMC will also show Fibre



**SAN Valley's new gateway encapsulates Fibre Channel data in Gigabit Ethernet packets.**

Channel data being quickly transported long distances between SANs over IP.

The company's package consists of EMC Symmetrix storage arrays, a Connectrix switch, replication software and a Cisco Metro 1500 or Nortel Networks OPTera Metro dense wave division multiplexing (DWDM) router.

At least one user is excited about the prospects of sending storage data across IP networks.

"Our long-term goal is to be able to do backup and disaster recovery across long distances at a reasonable cost," says a storage resource manager for a large retailer in Texas who asked not to be identified.

"The high cost of network lines has been one of the biggest obstacles in preventing us from doing that. With the advent of [metropolitan-area networks] and inexpensive cross-country fiber, we are looking forward to doing remote backup using Gigabit Ethernet," he added. His sites have more than 14 terabytes of EMC Symmetrix storage.

Strategic Research of Santa Barbara, Calif., says data storage capacity doubles every 1.5 years, causing a need for high-speed links such as those Gigabit or 10G Ethernet and DWDM can provide.

The SAN Valley and 3ware devices will ship by year-end. The SAN Valley SL1000 is not priced yet; the 3ware NSU costs \$29,000. EMC's optical SAN package is shipping.

SAN Valley: [www.sanvalley.com](http://www.sanvalley.com); 3ware: [www.3ware.com](http://www.3ware.com); EMC: [www.emc.com](http://www.emc.com); Cisco: [www.cisco.com](http://www.cisco.com); Nortel: [www.nortel.com](http://www.nortel.com)

## Vertical Networks to debut call-center applications

*Midsize businesses, branch offices can add call-center capabilities that previously were not practical.*

BY PHIL HOCHMUTH

**SUNNYVALE, CALIF.** — Vertical Networks this week will announce two call-center applications for its InstantOffice line of IP PBXs. The applications are designed to bring large-scale call-center capabilities to smaller offices.

InstantOffice Contact Center is aimed at midsize businesses, while Call Routing and Queuing (CRQ) is designed for small offices and branch offices.

The products run on the InstantOffice 5500 and 3500 IP PBXs, respectively, and offer call-routing features and simple management tools.

"Smaller offices have had a need for call-center capabilities for some time," says Alan Fraser, president and CEO of Vertical Networks. "Very large call centers usually take weeks of consulting to develop and implement, which is expensive. Smaller businesses need to implement call-center packages quickly and cheaply."

CRQ includes features such as call routing, queuing and report generation of customer call statistics, and is

designed for a call center of about 10 agents. InstantOffice Contact Center provides these capabilities as well as back-office software integration, Web support and an interactive voice-response system.

### Key selling points

The reporting features and advanced applications of InstantOffice Contact Center were key selling points for

Bob Jones, chief financial officer with The Laser Eye Center of Silicon Valley. Jones oversaw the installation of the call-center product, which runs on the clinic's InstantOffice 5500 IP PBX.

"[Contact Center's] reporting features let us understand more clearly what happens when a caller enters our system, and it allows us to respond to callers' needs bet-

ter," Jones says.

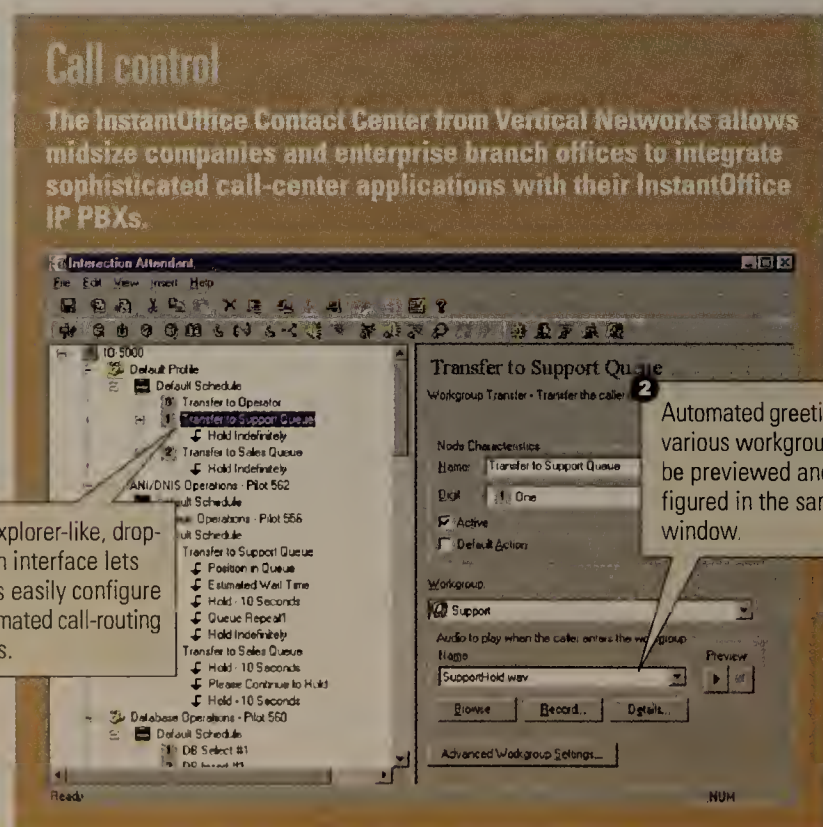
Jones also plans to integrate the call center with the company's Goldmine customer contact software on the back end. This will allow patients' data in the Goldmine database to instantly appear on an attendant's screen when customers call the clinic.

Jones adds that price was also a factor in his decision to buy Vertical Networks' IP PBXs and call-center software. He says the Vertical Networks products cost about half as much as comparable offerings from Lucent and Nortel Networks.

InstantOffice IP PBXs are specialized Windows NT servers with software that performs PBX functions. Vertical Networks was second, behind 3Com, in IP PBX shipments last year, with 20% of the 68,300 lines shipped.

InstantOffice Contact Center costs \$12,000 for a 10- to 84-seat license. CRQ costs \$5,000 for a five- to 84-seat license. Both are available now.

Vertical Networks: [www.verticalnetworks.com](http://www.verticalnetworks.com)



1 An Explorer-like, drop-down interface lets users easily configure automated call-routing paths.

2 Automated greetings for various workgroups can be previewed and configured in the same window.

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# Management tools aplenty at N+I

BY PHIL HOCHMUTH

A host of management tools for helping customers control, track and troubleshoot problems across enterprise networks will take a spotlight at the NctWorld+Interop 2000 show next week.

As companies rapidly increase network infrastructure, more network professionals are looking for products that give a big picture of the enterprise environment, and let them anticipate and fix problems before they become serious, analysts say.

"With the increasing number of remote workers and enterprises expanding out into branch offices, [IT professionals] need to manage a large number of distributed environments," says Gemma Paulo, a research analyst with Scottsdale, Ariz.-based Cahners In-Stat Group. This has prompted a slew of new software tools for managing network configurations and events, she adds.

At the show in Atlanta next week, Compuware will release its EcoChannel Web-based reporting console that ties together data from the company's EcoSystems network management and monitoring

tools. Products in the EcoSystems suite include a Web application health monitoring tool, server monitoring software and system analysis software.

EcoSystems provides critical data on network and server performance, says Michael McVaugh, a senior systems analyst



with Sunoco's IT headquarters in Philadelphia. He says centralized reporting data has become invaluable for managing the 135 Windows NT servers he maintains.

"We've got a huge investment in servers," he says. "Our management needs accurate, presentable information on what's going on with those machines."

F5 Networks will roll out a product bundle at Interop that includes cache management features designed to increase the efficiency and availability of cache servers. The product offers a single way for network managers to cache content and manage Web traffic, F5 says.

Radware will show its SynApps management technology, which it is integrating into its

entire line of Layer 7 switches. The technology is a combination of ASIC-based hardware functions and software tools that does the job of several management products.

Radware switches with SynApps technology combine hardware-based bandwidth and traffic management with software tools for application security and application health monitoring tools. This combination gives network professionals a centralized platform for multiple management tasks.

Sitara Networks will announce its QoSDirector policy management product. The software, which runs on a Sun Solaris server, can be used to set quality-of-service (QoS) policies on bandwidth allocation and network access across an entire enterprise or service provider network. The system has Lightweight Directory Access Protocol compatibility for managing users and objects in a network directory.

It also includes APIs for XML and HTTP for hooking it into a local intranet and SNMP for communicating with manageable networked devices.

Entuity will unveil Eye of the Storm 2.5, a program that alerts users to potential network prob-

lems in real time, and provides a port-level view of the network devices, giving net managers a better idea of who's using what equipment and when.

One user, a senior computer scientist with a leading global financial firm, is employing Eye of the Storm on his company's network to collect and analyze network activity data, and reclaim ports. The user, who wishes to remain anonymous, says the prospect of finding open ports ranks pretty high in his position.

"That's a biggie; it's nice to know you have free ports that people aren't using. You can start locking them down; it's cost-effective," he says.

Other network and application management products debuting at the show will include Valencia Systems' Aruba product and LANovation's PictureTaker Enterprise Edition. Aruba is software that can detect network bottlenecks and track carrier service bandwidth usage. PictureTaker is a tool that lets network managers package software into bundles and automatically distribute the software to PCs throughout a network.

*Staff Writer Denise Dubie contributed to this article.*

## CA upgrades Unicenter for remote, mobile users

*Version 3.0 extends automated software delivery to Windows CE and 2000, Palm and Linux.*

BY DENISE DUBIE

ISLANDIA, N.Y. — Computer Associates last week upgraded its Unicenter TNG product with features that let customers deliver software and other digital content to remote mobile and handheld users.

Software Delivery Option (SDO) 3.0 adds support for Palm OS, and Windows CE and 2000 as well as Linux operating systems. With SDO 3.0, customers can — from a central console — update and synchronize software running in everything from PCs to handhelds.

Now network managers can send data from one console to the software agents and machines on the network,

regardless of platform or location, says Allan Andersen, vice president of enterprise management at CA.

"[SDO 3.0 handhelds] are treated like any other device. They are automatically discovered whether they are in a cradle or on the network," he says.

SDO is made up of two components — a piece of code on the server and an agent on each device. From the server, customers can distribute software or data to SDO clients in the background with an eye toward CPU utilization and bandwidth usage, CA says. For example, if a user requires network bandwidth to download e-mail, the distribution will dynamically throttle back. If the connection

breaks, the delivery will automatically continue at the same point through automatic checkpoint restart capabilities.

That's an important feature to Chris Vecchiolla, project manager of the TNG Unicenter Development Group for Royal Caribbean Cruise Lines in Miami. He needs to deliver software updates to about seven Windows NT servers per ship, with each server supporting about 100 workstations.

Because Royal Caribbean uses satellites to distribute software, users sometimes lose connection to the network, but SDO's restart feature works through that problem.

"SDO picks up where it left off before the disconnect," he

says. With the remote control option in CA's latest offering, Vecchiolla says he can upgrade 80 workstations — a task that could take two full days to complete — in four hours.

Unicenter TNG SDO 3.0 is available now, and CA customers with maintenance contracts can expect SDO 3.0 as a free upgrade. Pricing for first-time buyers starts at \$2,000 for Unicenter TNG. ■

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# Infrastructure

**TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage**

## Briefs

**Foundry Networks** last week announced a new version of software for its ServerIron traffic management switches. Internet IronWare Release 7.1 provides what Foundry calls Content Aware Cache Switching, which is reported to reduce content duplication across caches to increase cache-hit ratio, improve Internet response time and save bandwidth costs. The software also supports streaming media protocols and provides accounting and statistics for the streams served, and assigns private IP addresses for security and IP address space conservation. With Internet IronWare 7.1, ServerIron now supports all major streaming media protocols, including Windows Media, QuickTime and RealMedia, Foundry says. Internet IronWare Release 7.1 is available at no extra cost to existing Foundry customers.

Foundry: [www.foundry.com](http://www.foundry.com)

**IBM** last week rolled out the 2074 Console Support Controller, designed to make adding mainframe images easier and less expensive. Each S/390 can be divided into 15 logical partitions (LPAR), or images, each operating like a server within a server capable of running different operating systems and applications. Until now, adding these LPARs required adding a separate IBM 3174 Establishment Controller for each. Now with a single 2074, an S/390 server can support up to 32 images, potentially saving customers hundreds of thousands of dollars. The 2074 connects to a mainframe via an Enterprise Systems Connection (ESCON) channel and each channel can support up to 16 sessions. The 2074 supports up to two ESCON interfaces and will be available Sept. 29. Pricing was not available.

IBM: [www.ibm.com](http://www.ibm.com)

## Intel rolls out enterprise VPN gear

BY APRIL JACOBS

**FRAMINGHAM, MASS.** — Intel unveiled VPN products last week designed to give enterprise users a simple, secure way to connect remote and branch offices over the Internet.

The new VPN Gateway devices, which are part of Intel's NetStructure network product line, can provide users with a secure alternative to private networks by letting them route their information over the Internet's public pipes through encrypted VPN tunnels. The products can also provide an alternative to expensive leased lines and help reduce remote dial-up charges.

Research suggests that more companies will begin to use VPN hardware and software over the next few years. For example, Infonetics Research in San Jose predicts the worldwide market for VPN equipment and software will more than triple from \$1.2



**The 3130 VPN Gateway can deliver up to 95M bit/sec of throughput and 10,000 simultaneous tunnels for VPNs.**

billion this year to \$3.7 billion in 2004.

Intel says it will also sell its line of VPN products to application service providers and hosting service providers that want to offer enterprise users managed VPN services. Those services could include secure pipelines to the data and applications those users have at hosted data centers. UUNET has Intel's VPN products available through its VPN Vendor Alliance Program.

Intel's VPN Gateway products comply with the IP Security 1.1 industry security standard and include an International Computer Security Association firewall, unlimited remote clients and a BlackIce Defender personal firewall.

Intel has four VPN Gateways in its product line. The high-end VPN gateways — the Intel NetStructure 3130 and 3125 VPN Gateways — feature up to 95M bit/sec of throughput and 10,000 simultaneous connection tunnels. The 3130 also features additional PCI slots for expansion. The 3125 features the same performance metrics as the 3130 but is a single-rack unit model. Both the 3130 and 3125 include the Intel NetStructure VPN Management Suite, which allows for security audits and usage analysis.

The 3120 VPN Gateway offers up to 20M bit/sec of throughput and 2,000 simultaneous tunnels for a midsize to large branch office or small central site. The low-end 3110 VPN Gateway features up to 2M bit/sec of throughput and 100 simultaneous tunnel connections for a small or midsize branch office.

Intel says it will offer a VPN software upgrade for its Express 8200 and 9500 routers to allow existing customers to integrate VPN, firewall, and WAN access and routing features without having to buy more hardware components. Those routers can be used in conjunction with Intel's VPN Gateways to connect small sites with central offices.

The Intel NetStructure 3110, 3120 and 3130 VPN Gateways are available for \$3,495, \$10,995 and \$20,995, respectively. The 3125 VPN Gateway will be available in mid-November for \$20,995. The VPN upgrade for the Express 8200 and 9500 routers will be later this month for \$499 for a single upgrade, or \$3,499 for a 10-device upgrade.

Intel: [www.intel.com](http://www.intel.com)

## Network Appliance bolsters storage devices

BY DENI CONNOR

Network Appliance rolled out two network-attached storage appliances last week for use by large companies requiring faster data access, scalability and performance for their transaction-intensive and e-business content-delivery applications.

The NetApp 800 Series file server appliances — the 840 stand-alone appliance and a cluster of two 840s called the 840C — are meant to fit in the largest of networks where high performance is necessary for delivering content quickly to users. The appliances can top 12 terabytes of system capacity and are capable of performing from 15,000 to more than 25,000 operations per second, two times as fast as the company's previous appliances, the firm says.

The 800 Series appliances are among the largest network-attached storage devices available. Auspex's 4Front NetServer 2000 has a capacity of 9 terabytes and EMC's Celerra a capacity of 28 terabytes.

Dave Durkee, chief information officer for application service provider NetLedger in San Mateo, Calif., says that while size is important, his company's applications are running out of bandwidth first.

"We are not as focused on capacity as performance," Durkee says. "The Network Appliance file servers let us suck the data

off the disk and get it on the wire about 50% to 100% faster than the previous servers." Durkee has more than 500 Network Appliance NetApp appliances using Network File System (NFS) on Linux.

In the clustered 840C configuration, both servers can failover for the other and continue operations unabated. The 840s connect to the network via a 10/100M bit/sec Ethernet adapter.

Durkee chose NAS instead of a storage-area network (SAN) for a few reasons. "We needed to build a very scalable, fault-tolerant array of computers using hundreds of computers," Durkee says. "SANs are limited to about 160 nodes per SAN. That's not good enough. SANs require additional hardware interfaces in each machine. . . . NAS only needs the network adapter."

The 840 also has redundant, hot-pluggable power supplies, fans and disks for increased fault tolerance. It can be configured as a RAID 4 device, in which only read operations overlap, or in a configuration where data is replicated from one 840 to another. Snapshot back-up capability is also possible, as well as data mirroring.

The 840 appliance with 120G bytes of data capacity starts at \$120,000; the clustered 840C with .5 terabytes of disk space is \$319,000. Both are available now.

Network Appliance: [www.networkappliance.com](http://www.networkappliance.com)

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# Microsoft reinvigorates handheld PC drive

BY JOHN COX

REDMOND, WASH. — Microsoft is retargeting the handheld PC market

with its recent announcement of a new package of software based on its Windows CE 3.0 operating system.

The additions to the package make

this class of device — usually consisting of a stripped-down, built-in keyboard and either a full- or half-size VGA screen — feel more like a standard Windows

PC. Separately, Microsoft has been busy enlisting hundreds of software and systems integration partners to tailor the handhelds for specific industry markets.

The software, dubbed Handheld PC 2000, now includes Internet Explorer 4.0, a built-in client to connect to Windows 2000 Terminal Services and Windows Media Player for multimedia files.

Also new is a smart card API, which will let computer manufacturers add card readers to these handhelds, effectively locking up any data they hold if the devices are lost or stolen. Hewlett-Packard's new Jornada 720 uses the Handheld PC 2000 software bundle and is the first of the new devices to include a card reader.

"Microsoft and the hardware vendors seem to have had a hard time positioning these kinds of devices and articulating their value," says Michael McGuire, principal analyst for mobile computing at Dataquest, a San Jose market research

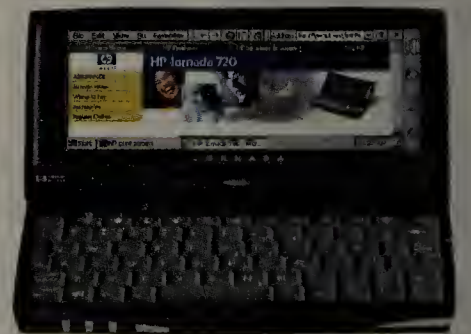


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## More power in your hands

HP's Jornada 720 will be among the first devices to include Microsoft's new handheld PC software. Features include:

- Support for Internet Explorer 4.0 and Windows Media Player.
- A built-in client for connecting to Terminal Server-based Windows applications.
- A built-in smart card reader.
- A faster StrongARM chip.



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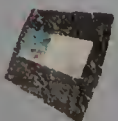
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firm. "Now you're seeing that the initial strong market for these devices — the 'clamshell' units and mininotebook-like computers — will be vertical markets where you're using a product as part of a specific solution, rather than deploying technology in a general-purpose fashion."

McGuire says a key addition is the built-in client for accessing applications on Windows NT 4.0 Terminal Server Edition, or Win 2000 Server. This means handheld PCs can be bundled with third-party software for a given market, and through the Terminal Services client access business applications running on Windows NT/2000 servers.

The new Handheld PC software is more aggressively targeted at corporate customers in specific industries, such as healthcare, financial services and manufacturing.

Microsoft: [www.microsoft.com/mobile/hpc/](http://www.microsoft.com/mobile/hpc/)



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WHAT'S SETTING YOUR PRIORITIES?



# Galileo pumps out high port density, low cost Gigabit Ethernet switch

BY PHIL HOCHMUTH

Higher port density and lower per-port Gigabit Ethernet switch prices

could be just around the corner from several major network equipment vendors thanks to switch OEM company Galileo Technologies.

Enterprise users will soon see the highest density of 10/100M bit/sec ports in a 1U (1 3/4-inch stackable unit) housing with Galileo's 48-port RD-Gal-

Stack, which includes two Gigabit Ethernet uplinks. The company also announced the RD-48360, a 12-port copper-based Gigabit Ethernet switch, which has a price per Gigabit port of around \$333, far below the industry average of \$1,021 per Gigabit port, according to Cahner's In-Stat Group, a market research firm in Scottsdale, Ariz.

In-Stat also reports that copper-based Gigabit Ethernet ports made up 25% of the nearly 500,000 modular ports shipped in the second quarter of this year.

The RD-GalStack could help solve a common problem for network managers: how to cram more 10/100 ports into a rack.

"Computer equipment is second to manufacturing equipment in our facility," in terms of spending and space allocation, says Joel Sanders, IT director for Doing Steel, a Springfield, Mo., engineering firm. Sanders says this fact constantly forces him to look for ways to save space while his company's network expands.



Galileo's RD-GalStack offers 48 10/100 ports in a 1 1/3-inch high enclosure.

Sanders says he likes the idea of fitting 48 ports into a 1U rack slot to save space.

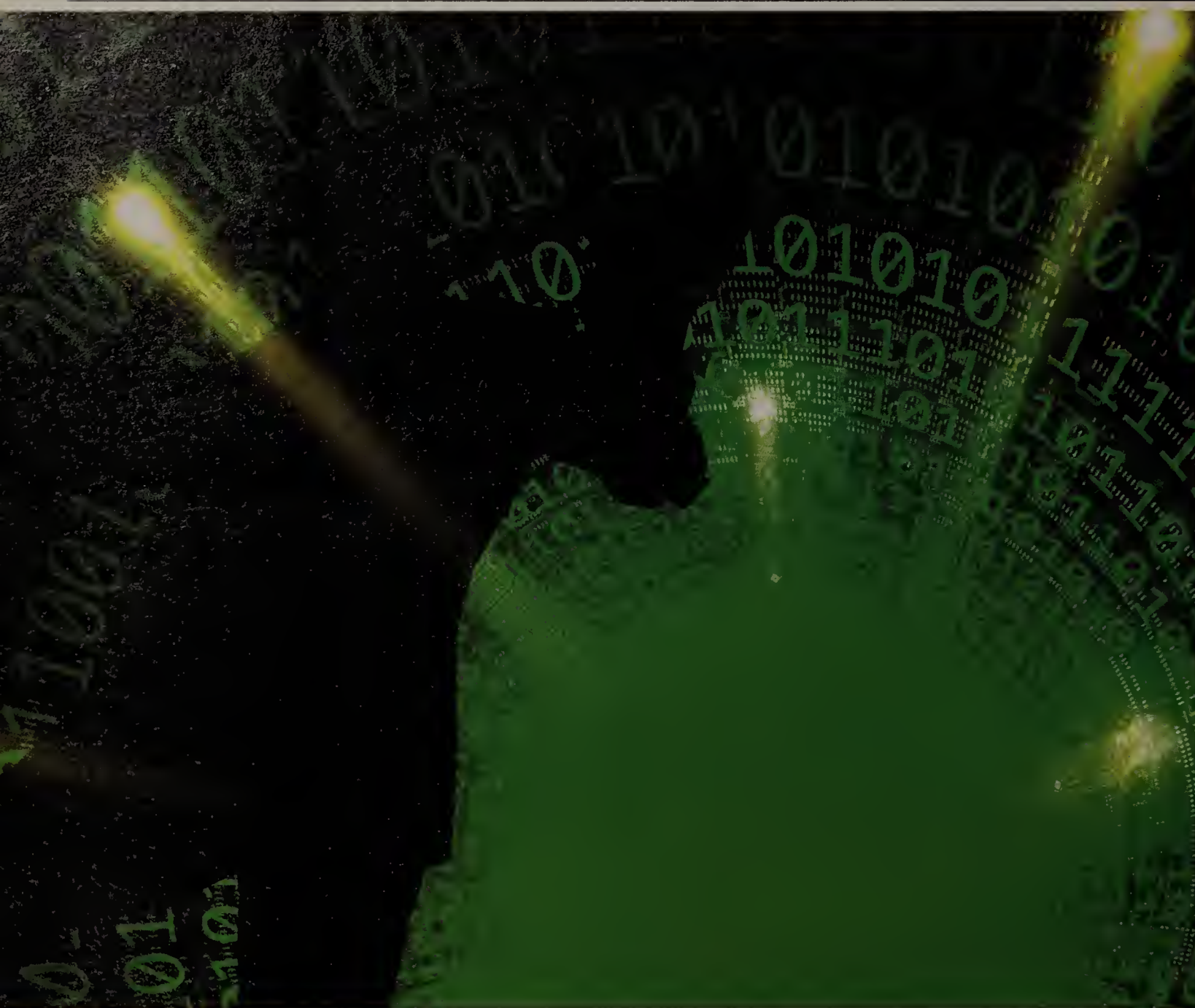
Keeping 48 ports cool in such a small enclosure was done by integrating the device's memory into the system boards, says Barry Gray, marketing director for Galileo in San Jose. This keeps the application specific integrated circuits (ASIC) that run the switch from overheating.

"Integrating the memory reduces the chip count for the OEMs, which helps reduce the heat that is generated by these ASICs," Gray says. "That's allowed us to pack all these ports in a very small enclosure."

While Gray would not give specifics, he says several major switch manufacturers will be shipping products based on the RD-GalStack and RD-48360 by the fourth quarter. Major network equipment vendors that act as OEMs for Galileo products include Cisco, Nortel Networks, Intel, Hewlett-Packard, Lucent and D-Link.

The RD-GalStack and RD-48360 are priced at \$4,000 each and will be available to OEM and end-user customers next month.

Galileo: [www.Galileot.com](http://www.Galileot.com)



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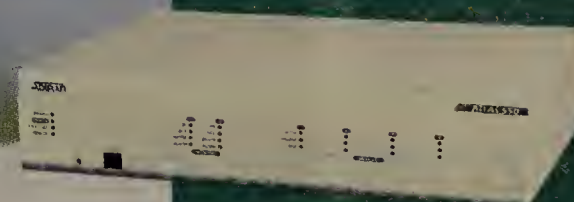
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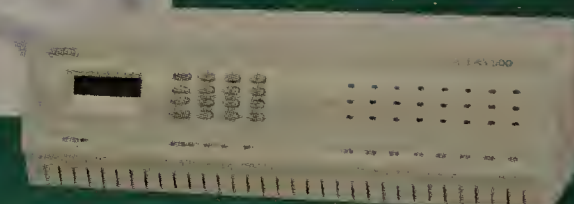
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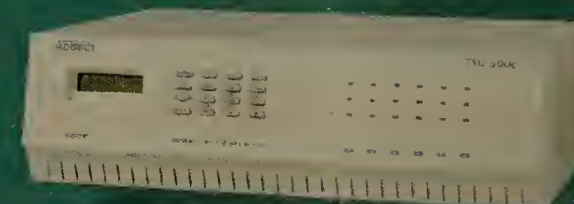
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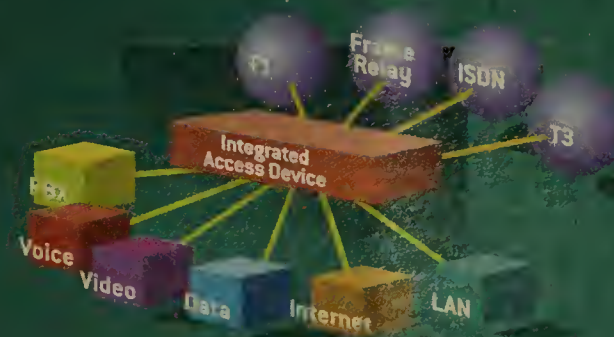
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Tolly on Technology . Kevin Tolly

## LACK OF PROVEN SWITCH INTEROPERABILITY HURTS AGGRESSORS

**P**ick a market — LAN switches, VPN access servers, Web switches. As soon as a solid market develops, aggressive players come out of nowhere

and try to steal market share from market founders. These market crashers mostly start out with at least one potential strike against them: Will their prod-

ucts work with existing gear?

Prospective customers always consider this issue. Without proof of interoperability, the suspicion lingers that

the devices might not work. Incumbent, market-defining vendors are in no hurry to prove that third-party gear works with their products. Surprisingly, though, the aggressive wannabe vendors seem oblivious to the benefits of proving interoperability.

Our recent Tolly Group/Network World LAN Switch Interoperability Study epitomizes some of these issues. For starters, the study — now in its second year — wasn't instigated by the insurgent vendors but rather by The Tolly Group and *Network World* on behalf of network managers. This illustrates that proven interoperability is not high enough on the priorities list of switch vendors.

While it can't be said that the studies have had massive participation, they have had respectable support from established and start-up vendors. In two years, 10 vendors have entered more than 15 Layer 2 and Layer 3 products. The results of this year's study will be released in the Sept. 25 issue of *Network World*.

What do customers think about interoperability and how does our study support or undermine those notions? Many customers believe that if vendors support the same standard, then they should be interoperable. In virtually every case where tests were made of basic standards, the switches worked.

On the other hand, our tests also succeeded in disproving this logic as well. We had to drop a test of industry-standard IEEE 802.3 flow control because we couldn't get a consensus from the participants on how to devise a legitimate, multiproduct test.

In this case, the standard can be interpreted legitimately in such a way that even though A conforms to C (the standard) and B conforms to C, we have cases where A and B don't work together. Legitimate implementations of the same standard are "unequal."

The network manager can posit that in deciding whether to bring "foreign" gear into the organization. It will probably work, but might not. The incumbent gets the advantage in such a situation.

Cisco, the universal incumbent, did participate in the test last year and this year. For that, Cisco should be commended, especially because it has no strong motivation for promoting third-party interoperability.

Ultimately, things have to work. Unless aggressive switching newcomers can prove their gear can work with incumbent products, the incumbents will always have the upper hand.

*Tolly is president of The Tolly Group, a strategic consulting and independent testing company in Manasquan, N.J. He can be reached at ktolly@tolly.com or www.tolly.com.*

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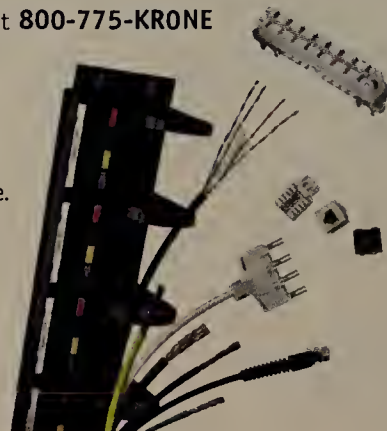
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# Public Network

With bandwidth becoming less of a barrier, more and more services that are now the domain of private networks will move to the Internet. By Doug Barney

IT IS EASY TO GET EXCITED about the Internet. After all, one huge network now links people all over the world. It has created a raft of billionaires and untold millionaires, and it has changed the very way many of us live.

On the other hand, this much-vaunted Internet frequently fails to perform, flunks even the most basic reliability tests, and continues to host the sneakiest, smartest, and meanest hackers.

In fact, the public network infrastructure, defined as networks that provide WAN services such as ATM, frame relay, IP services, and, of course, the Internet, are to blame for

current network bottlenecks, according to a survey of 500 U.S. and Western European businesses by International Data Corp. (IDC), Framingham, Mass.

For today's voice and data service providers, this public network represents huge new opportunity.

Already we have seen the 'Net move from a T-3-based network to a full OC-48 (2.4 Gbps)/OC-192 (10 Gbps) backbone. The result of all this new bandwidth will be that more and more services that are now the domain of private networks will move onto the Internet—just as many already have.

Many carrier voice and data services are moving to Internet-style technology, namely IP, making public

and private services increasingly difficult to differentiate, and helping carriers to sell more Internet Service Provider (ISP) services than the ISPs themselves.

All this development can only increase the Internet's popularity. "The value of a network increases as it becomes more intelligent, easier, and more convenient to use, and as more people/devices connect to it," explains Liza Henderson, vice president of consulting for TeleChoice Inc. in Tulsa, Okla. "Higher bandwidth, different access methods (wireline and wireless), unification of different media, portable devices, and single providers all contribute to making things easier and more convenient for the users."

Let's take a look at a few of the ways Henderson's predictions are coming true.

## VIRTUALLY PRIVATE

Many IT shops are replacing private lines with Virtual Private Networks (VPNs), which generally use IPsec to encrypt data and make the Internet appear as a private network. If you







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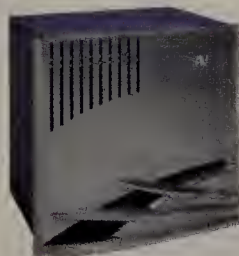
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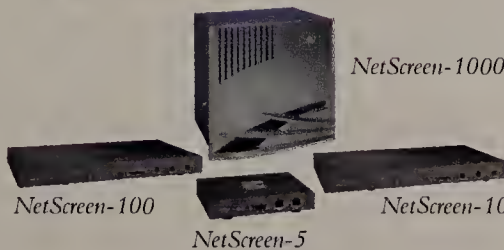
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can put up with an occasional delay, an Internet-based VPN saves money, and is easier to use, install, and maintain than its private counterparts.

Other organizations, with more mission-critical applications, are turning to VPN services from carriers and ISPs, where the traffic flows over a more tightly regulated backbone.

According to IDC, 17.3% of companies are currently using a VPN,

70% of users still struggling with 56K or, heaven forbid, 28.8.

### QUALITY OF SERVICE

Big bandwidth isn't enough for most hard-core corporate apps. That bandwidth has to be reliable and tunable. Just as today's top private networks offer quality of service (QoS) to keep voice from cracking and video from flickering, so must the Internet guar-

more flexible than a circuit-switched net, VoIP could also mean a raft of new services, such as voice recognition and unified messaging.

Once voice makes it to the Internet, we may invent whole new ways to mix voice with Web applications.

### MULTIMEDIA

Speed and lack of QoS are two main reasons why the Internet is still a poor substitute for television, but technology and market forces may come to the rescue.

According to Cahners In-Stat, Scottsdale, Ariz., a number of heavy hitters are building broadband networks to deliver video to TV screens based on ATM. However, when it comes to delivering video to PCs or wireless devices, IP will be the technology of choice.

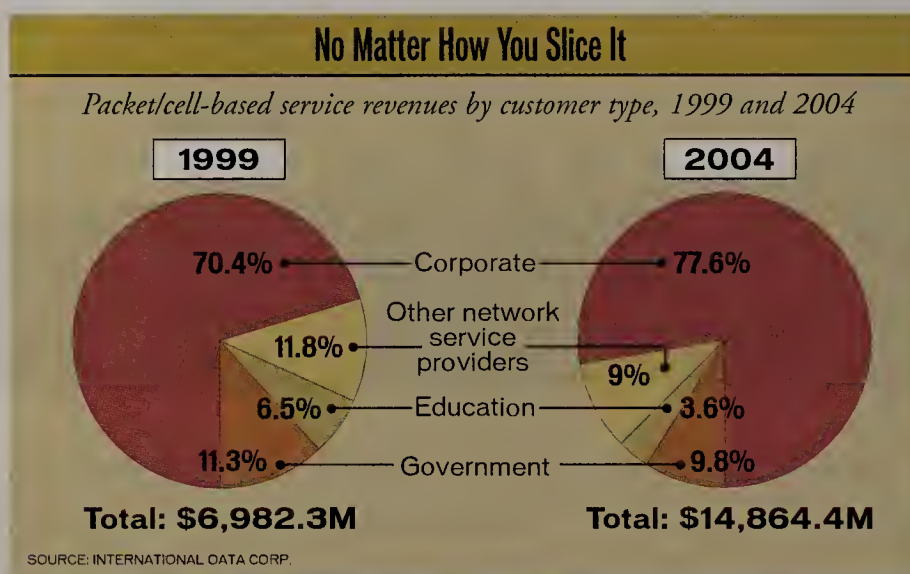
Here's what could happen if the AOL/Time Warner merger is approved. Imagine that AOL subscribers are lured to high-speed cable, and are served up an impressive combination of quality video programming and publications. The Internet, under this scenario, has not just caught up with TV, it has blown it away!

### THE INFO UTILITY

In fact, the Internet and carrier networks are getting so good so fast that many foresee an entire shift in how IT services are delivered—a trend PaineWebber had dubbed the "Info Utility." Installation and management of enterprise software and hardware will all be done by outside companies, such as application service providers, storage service providers, bandwidth providers, and consulting firms. And all this will be viewed and managed via the Web.

Clearly, today's public network has evolved into a medium for offering sophisticated, business-critical network services to the enterprise.

*Barney is executive editor, news, for NetworkWorld.*



with another 22.2% planning to do so in the next year.

### BEEFING UP THE 'NET

Equipment makers are making unbelievable strides—everything from gigabit routers and terabit routers to optical switching. And carriers and ISPs are buying all this gear and boosting connection speeds.

There are only two problems. Bandwidth demand is exploding as fast as the buildout, and some areas are easier to upgrade than others.

For instance, major metro areas have an array of high-speed access options—T-1, and a slew of cable, Digital Subscriber Line (DSL), and in some cases, wireless high-bandwidth offerings. But go out to the suburbs or the country, and cable and DSL coverage simply dries up.

IDC predicts that by 2004, nearly 30% of on-line homes will connect via broadband. However, that leaves

antee bandwidth if these applications are going to work.

Service Level Agreements (SLAs) from ISPs have been a huge leap forward. Unfortunately today it is difficult to track when and where service falters (ISPs don't always notify customers), and the agreements do not necessarily improve service—they provide compensation when it's bad. And SLAs generally do not span multiple ISP networks.

### VOICE OVER IP

Voice over IP (VoIP) will also be a huge trend; it's just not happening over the Internet with a capital I. Some corporations are using the technology internally, and many carriers are embracing VoIP—but offering it over private backbones.

VoIP, since it is cheaper than circuit switching to deploy, could reduce the cost of voice service. But since a packet network is inherently



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# GOING GLOBAL

**Multinational companies want service providers to be one-stop strategic partners, and to fill in the gaps in their own IT departments.**

**By Mary Ryan Garcia**

**T**ECHNOLOGY AND THE INTERNET not only continue to make the world a smaller place, but they also broaden the available marketplace to companies of virtually any size—provided they have the network infrastructure to support global E-business. Now is as good a time as any, perhaps, to take a look at the kinds of network services and products various service providers are offering, specifically to support global E-commerce, and how users will work with service providers to leverage these services to market into brave new worlds.

In a survey published last year by IDC, Framingham, Mass., analyst Mark Leary surveyed 502 IT managers at companies with 500 or more employees, and found that “solutions that feature expansion capabilities and high security/integrity grow more important as IT management is faced with rolling out rapidly advancing and business-critical intranets.”

As a result of global E-commerce, many organizations look to service providers to fill in the gaps in their own IT departments. “AT&T/BT Concert, Infonet/SBC, Equant, PSInet, and MCI Worldcom are the leading service providers offering services to support global E-business,” says Berge Ayvazian, executive vice president at the Yankee Group, a Boston-based research firm. “They are all evolving their service offerings toward IP, hosting, and applications, along with alliances with such companies as Commerce One.”

According to IDC analyst Melanie A. Posey, in her 1999 report, “U.S. Packet/Cell-Based Services Market Assessment and Forecast, 1999-2004,” the total packet/cell-based

services market alone stood at nearly \$7.0 billion in 1999, representing a growth rate of more than 43.2 percent over 1998’s total of \$4.9 billion. By 2004, IDC predicts the market will leap to \$14.9 billion. AT&T held the number one spot in the packet/cell-based services market in 1999 with a 32.2 percent share. “ISPs will migrate toward ATM backbones, use ATM to aggregate DSL-based traffic, and provide ATM-based voice and data services,” wrote Posey.

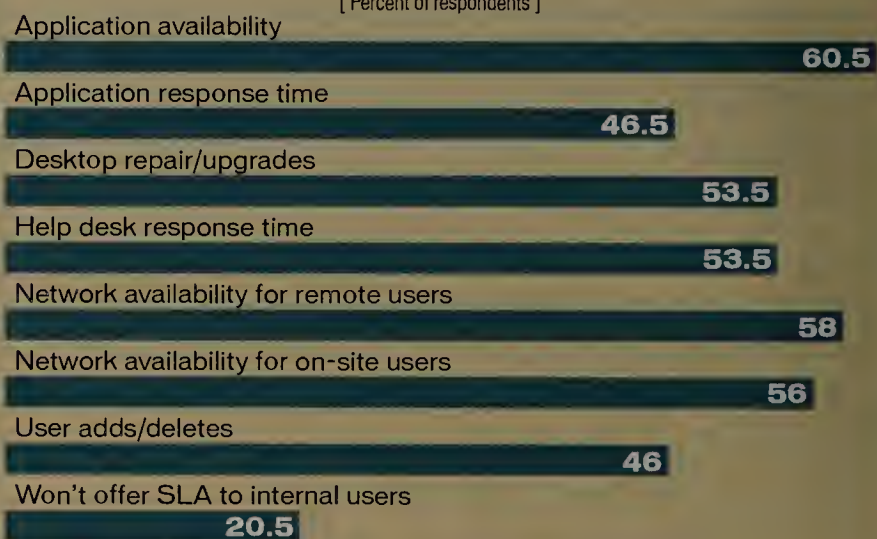
## COMPLEX DEMANDS

These days, however, customer demands are more complex than

### What Users Want From Service Providers

*Q: What type of SLAs will you require from your network service provider in the next year?*

[ Percent of respondents ]



SOURCE: IDC 500 CENSUS OF NETWORK EXECUTIVES



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ever, according to Liza Henderson, vice president of TeleChoice Inc., a consulting firm based in Tulsa, Okla. Some of the newer services currently in demand, she points out, include global Web site hosting, security, load balancing, distributed content services, global IP network services, connectivity to multinational offices, E-commerce, and supply chain management applications.

One leader of the global pack is Equant Network Services, Atlanta, with its iVAD solution. The offering is an integrated, global voice and data over IP solution available in over 50 countries. The service is offered as an enhancement to the company's Intranet Connect VPN service. With the service, network traffic is classified in accordance with an organization's global network requirements. The classification "colors" each packet and Equant applies traffic management to prevent Service Level Agreement (SLA) bottlenecks.

"Global E-business is still evolving, networking companies are trying to gain competencies in applications, and applications companies are striving to build a global network," says Henderson. "There are no clear leaders in the market today, but there are players better positioned to lead the global E-commerce space. Each of the top players brings something different to the business. There are too many pieces to the E-business solution to have a single global provider."

#### WANTED: PARTNERSHIPS

What do users want right now? "The industry typically focuses on the nuts and bolts of E-business services but pays much less attention to the edu-

cation and professional services aspect of E-business, particularly in a global implementation," laments Henderson. "Turning over an entire E-business solution to a global provider is a daunting business proposition to many multinational companies. E-business providers need to do a better job at educating the market. Customers are looking for strategic partnership relationships with their service providers. They need help in network and business planning, developing migration strategies, and other consulting/professional services before making the decision to implement an E-business solution."

It seems vendors are heeding the cry. Concert, for example, recently launched an expanded portfolio of IP-based and wireless services for global business and wholesale customers, which debuted with a multimillion dollar

advertising and direct marketing campaign. With the new portfolio, branded Concert IP, the AT&T/BT global venture reinforces its commitment to helping business customers migrate their networks and/or operations into IP and E-commerce environments.

Concert announced that it will offer the new portfolio to its 270 multinational customers through its sales force, and to its targeted 30,000 business customer base through its global network of distributors, including AT&T and BT in the U.S. and European markets, respectively. Among other things, the portfolio will offer IP Virtual Private Networks (VPNs), IP Enablers, IP Applications, IP Voice Services, Wireless, and Wholesale Services.

Henderson says that one challenge remains in managing various elements of a solution on a global scale. "A customer looking for a global E-business solution wants one 'point of contact' team for all their needs," she explains. "Too many solutions only cover some of the necessary pieces to a global E-business. E-business providers will need to form better partnerships within the value chain to begin to offer true one-stop global E-business solutions."

#### THE VALUE CHAIN

Over the next 12 months, the key direction for service providers desiring to better meet the needs of organizations growing their global E-business will rest with evaluating the customers' value chain and looking to develop partnerships to meet each point in the chain, says Henderson. "Data center providers will partner with server and software vendors, and access connectivity service providers, and consulting organizations, and Web site designers, and marketing companies, and logistics companies (shipping and return specialists), and call center companies, and so on along the entire value chain."

All of this, of course, will take some time, for service providers and corporate organizations on the cusp of global E-business. "With the service providers, it's a multi-year program," says Frank Dzubeck, president of Communications Network Architects, a consulting firm in Washington, D.C. "No one is fighting it, you just have to move at a certain pace. Over the next 12 to 18 months, the service providers will proceed as they have been, and will become a lot more specialized. A synonym for service providers is outsourcing. Organizations circumvent their lack of IT people with outsourcing."

*Garcia is a freelance technology journalist based in Coram, N.Y.*

**"A customer looking for a global E-business solution wants one 'point of contact' team for all their needs."**

Liza Henderson, VP, TeleChoice Inc.



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# SERVICE PROVIDERS SEEK E-BUSINESS PLAY

**W**HEN YOU WANT TO WATCH a pay-per-view event on TV, your money goes to your cable operator, since they're the ones who control the infrastructure between you and the content. If you wanted to watch the same event on a paid Webcast, however, the owners of the infrastructure—your service provider—wouldn't get a dime.

This contrast between the worlds of cable TV and the Internet may be a bit oversimplified, but it illustrates a basic market truth. Today's service providers are carrying a lot of data traffic that's making other people rich. E-tailers are selling products, trading sites are racking up commissions, and auction sites are building constituencies. But service providers themselves haven't been able to capitalize on these rapidly growing revenue streams.

That's why so much attention is now being focused on service provider business models and infrastructure. Incumbents are anxious to leverage their installed customer bases and robust transport infrastructures to move into higher-margin services. And their competitors are looking for ways to differentiate

**Look for fundamental changes in the business model and infrastructure as providers ramp up.**  
**By Lenny Liebmann**

themselves from their elder adversaries through innovative market offerings.

## THE HOLY GRAIL

"Value-added IP services are the Holy Grail for next-generation service providers," declares Ron Westfall, research director of Current Analysis, a Sterling, Va.-based market research firm. "The ability to offer customers a menu of such services—and the ability to activate those services in real time—will be essential for service

providers as they evolve out of the pure transport business," says Westfall.

In order to achieve these goals, service providers are looking at a variety of so-called "IP services platforms" that make service activation as simple as clicking a few icons on a provisioning screen. These platforms include offerings from venture-funded startups as well as industry heavyweights.

While the features and functions of these IP services platforms vary, their fundamental goal is similar: to allow easy activation of multiple services over a common IP "pipe"—even though that activation requires configuration changes on a variety of devices at the core and the edge of the service provider's network, as well as on the customer's router.

But what exactly are these next-generation services that will be made available with point-and-click ease?

Nine times out of ten, the term "services" is simply a codeword for secure VPNs over the public Internet. "E-business is about being able to tap into distributed resources regardless of where they are and who they belong to," says Frank Dzubeck,



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president of Communications Network Architects, Washington, D.C. "VPNs are fundamental to attacking that space."

#### AN ARM FOR AN ARM

The problem for service providers is twofold, according to Dzubeck. First, customers still don't have tremendous confidence in shared network infrastructure. Second, any large-scale customer migration away from private leased lines to 'Net-based VPNs will undermine a primary source of service provider revenue. "It's a matter of deciding to cut off your left arm so that your right arm can survive," he says. "Most service providers just aren't ready to give up their private-line revenues."

Service providers who are willing to make the transition to VPN-based communications, though, will theoretically open the door to a whole new range of E-business offerings. If they

Web page where customers can actually do their own self-provisioning. So ordering a VPN or a movie from your service provider would be as easy as dialing your cable provider's 800 number.

While such theoretical scenarios are worked out on conference whiteboards, many service providers are already delivering more fundamental E-business services—including site hosting and managed firewalls.

But moving into these markets presents still another problem for mainstream service providers. Web systems and application talent come at a high premium, and represent a very different skill set from service providers' core business. "The service provider workforce is highly unionized," adds Dzubeck. "How many computer people really want to be unionized like that?"

That said, it's still clear that network service providers and ISPs alike are going to try to capitalize on their corporate clientele's growing appetite for E-business support—especially as broadband access becomes more commonplace. "The DSL market is a lot like dial-up was," observes Bill Van Emburg, president of Piscataway, N.J.-based Quadrix Solutions Inc. "At first, you'll be able to make money just by offering plain vanilla access at the right price. But you don't want to end up competing

## "Value-added IP services are the Holy Grail for next-generation service providers."

Ron Westfall, Research Director,  
Current Analysis

on price alone. You have to be able to offer value-added services to avoid 'churn' and generate incremental revenue."

Van Emburg's company is going after that revenue with managed services and strong infrastructure support for ASP partners. That

means implementing much more granular traffic management and monitoring tools. "I need to go right down to the IP address and port number, and ultimately I need to identify traffic by application and/or service," he explains. "You can't get that from conventional network hardware MIBs or Web server logs."

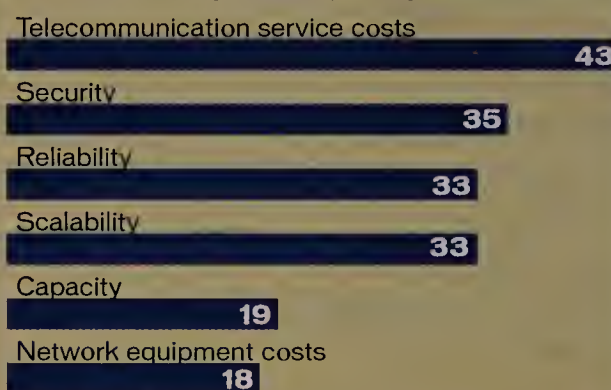
For its part, El Segundo, Calif.-based international carrier Infonet is combining its global transport services with security enhancements such as digital certificates and messaging services built on Lotus Notes. "B2B E-commerce requires our customers to interface their private networks to the public Internet," says Jean-Noel Moneton, vice president and general manager for Infonet's Global Internet Services. "That interface represents an excellent opportunity for us to play a key role in supporting our customers' E-business initiatives."

In addition to modifying their own business models and infrastructure to bring higher-value E-business offerings to market, service providers will probably have to partner with companies that are strong in technologies such as caching and Web site management. That kind of partnering is more familiar to the dot-com world than to mainstream service providers. It will thus be interesting to see what sort of partnerships and acquisitions unfold.

*Liebmann is a Highlands, N.J.-based technology consultant and writer.*

### Plenty Of Good Reasons For VPNs

Q: Which factors contributed most to your decision to use or evaluate SP-based VPNs?  
[ Percent of respondents ]




SOURCE: IDC 500 CENSUS OF NETWORK EXECUTIVES

can selectively deliver, monitor, and bill specific traffic "flows" over shared IP networks, then they should be able to generate income from secure B2B extranets, on-demand ASP access, and even pay-per-view streaming multimedia.

In fact, if activating a service can be made that simple, then it's a small step for service providers to offer a secure






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# THE Integration Generation

**Service providers are devising new ways to offer high-quality video and audio content, as well as to manage merged voice/data networks.**  
**By Howard Millman**

**E**XPERTS PREDICT that no matter how fast the Internet's infrastructure grows, it will never keep pace with the exponentially increasing demand for bandwidth. Traditional carriers that are reluctant to upgrade their infrastructures may find themselves outdistanced by upstarts and startups while they wait to see definite growth signals.

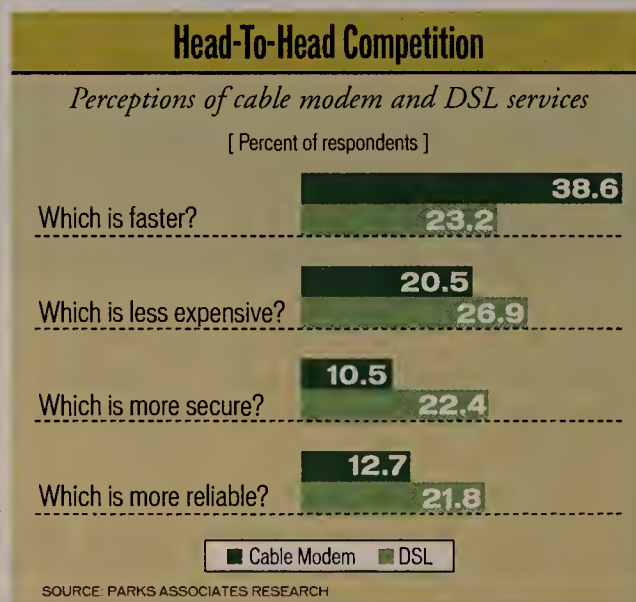
"The demand curve for digital end-to-end bandwidth is exponential," says Vishal Desai, president of Savli Group, an enterprise management consulting firm in Rockville, Md. Demand alone will not, he maintains, fuel infrastructure expansions and enhancements. "The carriers' fundamental business model is more complex. They want to see a growing customer base, rising demand for bandwidth, and to know where revenue will come from before they invest in infrastructure improvements."

"Carriers tend to invest in infrastructure improvements only when they have to; for instance, to

compete with the cable companies," says Hongjun Li, a telecom analyst with Parks Associates in Dallas. "That's why it took until the middle of last year for carriers and telcos to get serious about DSL."

Li sees more opportunities than just DSL for increasing revenues. "Right now the broadband demand is driven by the need for fast, low-cost access to the Web. But fast access is not the killer app; that will likely be entertainment."

A Parks Associates survey of 600 broadband users reveals that cost, while important, ranks below performance and service quality for adoption. Ranked in order of priority were: high-speed access, instant Internet connectivity, followed by constant Internet connectivity. Cost, quality content, and freeing up a phone line ranked lower. Li advises carriers seeking to increase revenue from the sales of broadband to con-





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#### NEW SOLUTIONS

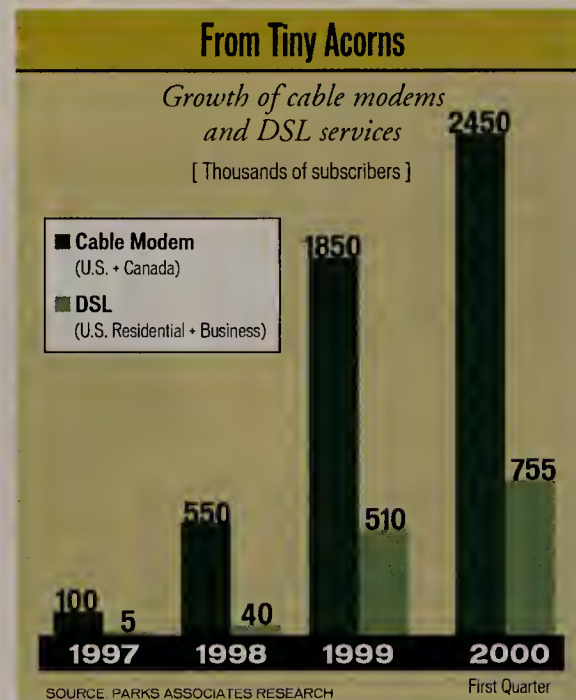
While installing optical wide area networks, high-speed routers, and Digital Subscriber Line Access Multiplexer (DSLAM) to provide high-speed access to the Internet cloud is expensive, what if carriers hold down the cost by implementing geographic changes, rather than structural, to the data delivery model?

One potential solution, Edge Broadband, moves the storage of content, especially bandwidth-hungry content such as movies and audio, to the "edge" (the rim of the Internet cloud), where it is hosted by ISPs instead of the core server farms in the hub. By eliminating the need to transmit the data over backbones, and using just local loops, this strategy can save time and reduce network bottlenecks, and, providing that the local ISP's or host's facilities are secure, increase the data's security.

A variant of the Edge Broadband model sends audio and video content over a single pipe to a distributor who streams it to the ultimate customers. By avoiding the current practice of transmitting content over multiple separate connections, both the content provider and the carrier can reduce bandwidth and maintenance costs, reduce the number of servers, and improve performance.

While technically feasible, Edge Broadband is not a panacea. It can increase the complexity of refreshing data to keep it current and pose a significant capital investment to create the satellite distribution stations.

Stations can be situated nationally or overseas, a strategy that helps exploit expanding opportunities for providing frame relay, VPN, and ATM services to multinational com-



panies with a presence in Europe and Asia. Some of the most promising markets exist in Malaysia, Taiwan, Denmark, and Finland. Local political and cultural hurdles pose formidable challenges, however, to building out end-to-end networks.

Edge Broadband, fiber optics, and overseas expansion have merit as longer-term solutions. What options are open to carriers in the near term?

"Begin to modularize the Internet," advises Desai. "The Internet of the future will consist of a collection of small Internets dedicated to serving the needs of specific vertical markets. For example, the airline and automotive industries are developing their own dedicated Internets, as has NASA," notes Desai. He should know—he was the former head of NASA's Network Management Group.

#### ALL ABOUT MANAGEMENT

Li agrees, adding that by breaking up the Internet into virtual pieces, it will be easier for carriers to manage selected segments and to provide better service. "The current Internet is so huge that it's impossible to manage," he notes.

Parks Associates' survey results indicate DSL enjoys an overall

advantage over cable modem service in the consumers' minds. Li largely attributes the advantage to DSL's association with telcos, which have traditionally enjoyed a better reputation than cable companies. However, he cautions, past reputation alone is inadequate to determine who will win in the broadband marketplace.

While entertainment may evolve into a clear revenue producer, there's another opportunity that carriers should investigate—Voice over IP (VoIP). According to a survey from International Data Corp., Framingham, Mass., voice-related enterprise network

management will represent \$625.3 million, or 39%, of the overall enterprise network management opportunity by 2004, up from a mere \$17.9 million, or 1%, in 1999.

#### OPPORTUNITY AWAITS

The management of merged voice/data networks offers carriers a major opportunity to stake out unclaimed territory and achieve an expanded foothold in the IT environment. There is also a secondary benefit, according to Li. "By developing packetized voice and related management solutions, carriers can recover some of the revenue lost in the long-distance price wars."

Li advises carriers not to dawdle and dwell on how VoIP could compete with their traditional business. "If the carriers don't participate [in delivering VoIP services], then other companies will get the whole pie. Those carriers stand to lose the voice traffic and, worse, not get anything in return." The answer may be to follow roads less traveled and pursue uncommon solutions.

*Millman operates Data System Services LLC, an integration and networking consultancy in Croton, N.Y.*



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# Wireless: ON THE VERGE OF Greatness

Coverage is expanding, standards are evolving, and broadband fixed wireless may solve the last-mile problem.

By Doug Barney

**F**OR YEARS IT HAS SEEMED that the world of wireless was on the verge of a breakthrough. This year is no different. New wireless technologies abound, but coverage is still spotty, services can be expensive, and reliability remains suspect. Compared to Europe, particularly Scandinavia, the U.S. is in the relative dark ages of wireless.

Lack of network standards is a big part of the problem. Where Europe has one, Global System for Mobile Communications (GSM), we have three—Code Division Multiple Access (CDMA), Time Division Multiple Access (TDMA), and GSM.

But there is light at the end of the tunnel in the form of new frequencies, new services, and new investments. Already there are more service choices and features such as Web

access from the cell phone. And more handhelds are coming standard with wireless modems and services.

#### MORE COVERAGE

On the mobile end-user side, there is a steady, though not-explosive, increase in speeds, and a rather more remarkable boost in features. Right now the emphasis of the service providers is increasing breadth of coverage; bandwidth boosts will soon follow.

Wireless end users will gain dramatically greater access to the Web through the Wireless Application Protocol (WAP). Today, every mobile device handles text and graphics differently. WAP standardizes all this, so developers can more easily adapt content for myriad devices.

International Data Corp., Framingham, Mass., believes that by next year all new digital handsets will be WAP-enabled, although not all customers will use the WAP features. In fact, by 2004, only a third of all wireless users will be connected to the 'Net, according to Aberdeen Group, a Boston-based consulting firm. Still, at 75 million people, that's a lot of eyeballs.

Unfortunately, until network

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PROJECT MANAGEMENT: Bill Laberis Associates [www.laberis.com](http://www.laberis.com)  
MANAGING EDITOR: Colleen Frye DESIGN: Nancy Kowal Design  
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buildouts are done, wireless browsers will remain limited by slow data rates and small screens. "Handsets today are similar to how people used the Internet years ago, where if you got a 14.4 connection, you were psyched," says Eric Rasmussen, senior consultant, TeleChoice Inc., Denver.

Over the next few years, data rates will go up, leading to new applications, and new devices that could boast higher resolutions, and more features such as voice, E-mail, and limited video built in. "It is getting us closer to the Dick Tracy-style interface," Rasmussen says.

#### THE LAST MILE

Perhaps the most important trend is the way wireless technology may solve the last-mile problem. Much of

**"Handsets today are similar to how people used the Internet years ago, where if you got a 14.4 connection, you were psyched."**

Eric Rasmussen, Senior Consultant,  
TeleChoice Inc.

the country may never have high-speed options such as Digital Subscriber Line (DSL) and cable modems. That's where broadband fixed wireless steps in. "What is really nice is it enables businesses" to

avoid the ILEC (Incumbent Local Exchange Carrier) option "by offering a local loop alternative," Rasmussen says.

This technology generally uses line-of-site radios to transmit data at high speed, eliminating the need to lay fiber. Fixed wireless can be used for dedicated point-to-point connections, shared connections for Internet access, and for bringing high-speed services, including voice, video, and VPN, to telecommuters.

But the real beauty of fixed wireless is that it is symmetrical, meaning data moves up as fast as it moves down, and it has an impressive maximum data rate of 44 Mbps, faster than xDSL or cable.

*Barney is executive editor, news, for NetworkWorld.*

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# Carriers & ISPs

**The Internet, Extranets, Interexchange  
and Local Carriers, Wireless, Regulatory Affairs**

## Briefs

**WorldCom** last week inked a deal with Virginia to build the state's government data network. The network, which is called the Commonwealth of Virginia Network (COVANET), will link 4,500 sites over multiple OC-12 SONET rings. The five-year deal is valued at \$50 million. State agencies, universities and local government offices will connect to COVANET via frame relay or ATM dedicated connections. Remote sites will also have the option of accessing COVANET via the Internet.

WorldCom: [www.wcom.com](http://www.wcom.com)

Multinational service provider **Equant** is launching Microsoft application-hosting services, the company's first foray as an application service provider. Equant's fully managed application service includes Windows 2000, Office 2000 and Exchange Server software options. Equant is offering the service in 130 countries.

Equant: [www.equant.com](http://www.equant.com)

**Broadwing** is continuing its push into the competitive local telecommunications business in two more states. The service provider last week filed for competitive local exchange carrier (CLEC) status in Arizona and Pennsylvania. Last month Broadwing filed for CLEC status in Texas, Ohio, Florida, Illinois, Kentucky, Indiana, Michigan and Washington, D.C., where it now has approval. It can also offer local services in New York.

Broadwing: [www.broadwing.com](http://www.broadwing.com)

**Ford Motor Company** has chosen DSL providers Covad Communications and Big Net to supply DSL Internet access to 178,000 of Ford's employees. The deal will help Ford offer employees PCs, printers and Internet access for a nominal monthly fee.

## Voice over DSL begins to take hold

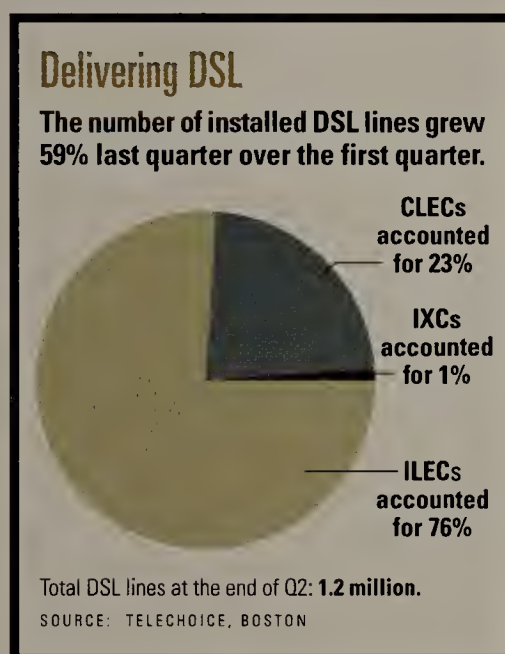
*Technology could be a cost saver for small and midsize corporations.*

BY MICHAEL MARTIN

Service providers touting voice over DSL as a cost-saving tool for small and midsize businesses are beginning to roll the technology out commercially.

Voice over DSL is less expensive for competitive carriers to offer than plain old telephone service (POTS) voice because with voice over DSL, up to 16 voice lines and a high-speed data connection can be offered over one copper loop. POTS voice requires one copper loop per voice line. Because a competitive carrier must lease loops from an incumbent local exchange carrier (ILEC), the more voice lines a competitive provider can squeeze onto one copper loop, the less expensive its services should be.

Network Plus, a Boston business communications provider, has deployed voice over DSL to about 100 loops in New York and about 25 loops in Boston.



Rob Hale, the company's president, says the technology has worked perfectly so far, but Network Plus is not going into a full commercial rollout because implementing voice over DSL is a time-con-

suming process.

"Once installed, the product works like a gem," Hale says, "but getting it up takes a while."

Hale says the problem lies in the loop-provisioning process. Leasing a loop from the ILEC and getting it provisioned for DSL takes too much time and ties up too many resources, he says.

Once the loop provisioning process is ironed out, Hale believes voice over DSL will find a home in many corporations.

He says voice over DSL offers three major benefits: more bandwidth and voice lines over an infrastructure; lower costs; and the ability to grow from eight to 16 voice lines at the stroke of a computer key, rather than having to wait weeks for a carrier to provision more lines.

Companies should expect to save at least 10% on a voice-over-DSL service as compared to a combination of POTS and data service, Hale says.

See **Voice over DSL**, page 36

## AirLoom service 'adapts' HTML to wireless

BY JOHN COX

A new online service lets enterprise customers quickly forge wireless connections to their Web content.

Using the AirLoom service, several types of wireless devices can access data — such as contact databases, field service manuals and pricing information — on a corporate Web.

AirLoom is a joint development by wireless systems integrator Aether Systems and AlterEgo Networks, a network provider with software that, in effect, translates HTML pages into formats suited for interactive pagers, PDAs, Web phones and the like.

"AirLoom is a quick, affordable, outsourced solution to take existing HTML content and 'adapt' it, so anyone with a wireless device can access it," says Evan Deoul, Aether's vice president of wireless Internet services.

Here's how it works: An enterprise customer identifies the Web content it wants to make available to wireless users, such as a sales force, field service

technicians, business partners or customers. A team from the two vendors creates a mock-up of what a wireless user would see and do, based on the person's specific device. The mock-up becomes an XML stylesheet for that device; and the stylesheet automatically packages the requested information into a format for a Palm or a Nokia screen phone, for example.

Wireless users receive an AirLoom URL. They connect through their wireless carrier, which connects to Aether's network operations center. Aether then passes the request, via dedicated T-1 links, to AlterEgo's nationwide network of nine server farms, collocated with InterNAP, a private, high-performance Internet service. AlterEgo software at these sites processes the request, passes it to a Web server on the corporate intranet (if necessary through a firewall), and then packages the response into the proper format for the requesting device.

More than half of Fortune 1000 companies have employees dedicated to bringing corporate applications to the

wireless world, says Jennifer DiMarzio, an associate analyst at Summit Strategies.

"Aether and AlterEgo are offering a complementary service," DiMarzio says. Aether's engineering expertise and AlterEgo's ability to support a variety of applications on nearly all wireless devices makes for a strong service offering, she says.

Aether plans to work with enterprise

See **Wireless**, page 36

[www.nwfusion.com](http://www.nwfusion.com)

### ADAPTING TO THE WEB

AirLoom's service lets you convert Web content to mobile devices.

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## Voice over DSL, continued from page 35

Network Plus' standard offering — eight voice lines with 450K bit/sec data connectivity — costs approximately \$450 per month. Hale says eight POTS lines would normally cost between

\$350 and \$450, with a data connection going for between \$200 and \$600.

Harold Bondy, president and CEO of New York technology firm Microserve, says his company has been successfully using a symmetric DSL voice over DSL system for several months. Microserve also resells voice over DSL for Trans-

beam, a New York communications provider.

The Polycom voice over DSL customer premise router at Microserve's office supports up to eight voice lines and a high-speed data connection over a 1.5M bit/sec line. If no voice calls are going out, the entire 1.5M bit/sec can

be used for data, Bondy says. Each voice connection carves a dedicated 64K bit/sec virtual circuit out of the 1.5M bit/sec.

Bondy still has POTS service in case anything goes wrong with his voice over DSL, but says he's happy with the quality of his service.

The quality of voice calls made over DSL shouldn't be an issue, says Stephen Gleave, vice president of marketing for voice-over-DSL gateway manufacturer Jetstream, because voice over DSL travels over ATM technology, which lets voice get priority over any data traffic traveling over the DSL line.

**"Once installed, the product works like a gem, but getting it up takes a while."**

Rob Hale, President  
Network Plus

The only potential problem Gleave sees with voice over DSL is that customer premises equipment will fail. If there is a power outage, unlike the public switched telephone network (PSTN). He adds businesses can get around this by installing battery backups or using cell phone service in the event of an outage.

Gleave says Jetstream has been trialing its voice-over-DSL gateways, which sit in front of traditional Class 5 voice switches and turn ATM signals into PSTN signals, with approximately 50 U.S. carriers. More than 20 of those carriers are introducing limited commercial voice over-DSL deployments, he says.

Network Plus: [www.nwp.com](http://www.nwp.com); Jetstream: [www.jetstream.com](http://www.jetstream.com)

## Wireless, continued from page 35

and service provider customers of AirLoom to add an array of additional services, according to Aether's Deoul. A travel portal might use AirLoom to let passengers view their itinerary, he says.

Then the portal might get AirLoom to send messages to the passengers alerting them to a change in a plane's departure or arrival time.

For enterprise users, AirLoom charges start at \$35 per user per month. For portal or other service providers, the initial promotional price is a flat fee of \$2,500 per month.

Aether: [www.aethersystems.com](http://www.aethersystems.com); AirLoom: [www.airloom.com](http://www.airloom.com); AlterEgo: [www.aego.com](http://www.aego.com).

Senior Editor Denise Pappalardo contributed to this story.

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## Eye on the carriers

David Rohde

## INTERMEDIA'S FATE HANGS IN THE BALANCE

**N**obody has the ability to make people nervous quite like Bernie Ebbers.

First he made thousands of poor Sprint employees hang onto their cubicle walls for dear life during his megamerger caper. Now another bunch of telecom workers get to undergo the same insecurity about what could happen to them in WorldCom's hands.



It's not the folks at Digex, a managed-hosting provider that WorldCom just bought. Bernie practically handed them the keys to WorldCom's kingdom, lauding Digex so much that he even said he'd turn over UUNET's hosting assets to them.

Rather, it's the people at Intermedia, Digex's nominal parent company. Ebbers made it clear he was buying Intermedia just to get at Digex. He all but said he would put Intermedia right back on the market to help make the Digex takeover pay off.

Ebbers thinks Intermedia's core local fiber, regional frame relay and shared-tenant services overlap WorldCom's business. Since one man's overlap is another's opportunity, here are some possible bidders to take pieces of Intermedia off Bernie's hands:

- Sprint. Without the WorldCom deal, Sprint is back struggling to define its local-entry strategy. Because it's the incumbent local carrier in a bunch of small markets, it seems it can't quite think like an alternative local carrier in big markets. It's tried such implausible gambits as claiming that someone else's DSL access to its Integrated On-Demand Network converged service constitutes local entry, or that its fixed-wireless Bell bypass in a few markets indicates big things ahead. Intermedia would finally make it a real competitive local exchange carrier (CLEC) in some important markets.

- The Bells. They know Intermedia because Intermedia often provides frame relay network-to-network interfaces at the points where the Bells' data nets cross local calling boundaries. Regulators might not let BellSouth buy Intermedia because Intermedia's base is in the Southeast, and such a move could be considered anticompetitive. But Verizon or SBC Communications should have a green light to buy Intermedia. Both signed conditions to recent mergers

requiring them to become CLECs out of their regions.

- Qwest Communications or Global Crossing. Qwest's local business comes from its US West takeover, while much of Global Crossing's local territory is in the nation's northern tier where its former Frontier unit operated. Intermedia could

be a great fit for either company. But Qwest shares an equity investment with BellSouth, and regulators may fret if they think Qwest has its eye on buying Intermedia and then BellSouth.

- The "BLECs." You're going to be hearing a lot about the so-called building local exchange carriers, such as the lav-

ishly funded BroadBand Office whose 80 commercial real estate owner-partners claim to control 25% of U.S. office space. Intermedia owns some older shared-tenant telecom service providers with entry into individual buildings.

It's a long shot, but stranger takeovers have happened. ▣

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## Briefs

**Iperia** last week released Version 2.0 of its Iperia Service Node (IPSN), a provisioning system for service providers who offer voice, unified messaging and other services over IP networks. Notably, IPSN 2.0 utilizes Session Initiation Protocol (SIP) to connect with soft switches, media gateways and integrated access devices. SIP is a lightweight call setup protocol that competes with the older H.323 protocol as a method for two endpoints to negotiate a multimedia packet session ([www.nwfusion.com](http://www.nwfusion.com), DocFinder: 9928).  
Iperia: [www.iperia.com](http://www.iperia.com)

**Lucent** last week won a contract from NextLink to deploy Lucent's WaveStar optical networking products to remotely distribute bandwidth along NextLink's emerging intercity network. The initial phase of the contract, worth about \$25 million, includes deployment of Lucent's WaveStar time-division multiplexer 10G byte service node in various central offices, plus the WaveStar Bandwidth Manager, which will enable NextLink to switch user connections remotely from its network operations center in Plano, Texas.

**Tellium** announced it's shipping its Aurora Optical Switch, a high-density optical switch for the Internet core. The company says Cable & Wireless has signed up as a customer. Aurora supports 512 OC-48 connections in its initial configuration and boasts a switching capacity of 1.28 terabit/sec. Competitive products include Sycamore Networks' SN 16000 and the yet-to-ship Monterey wavelength router from Cisco. Sycamore says its SN 16000 will scale to 512 OC-48s before year-end though the company is shipping only a 64-port version at this point.  
Tellium: [www.tellium.com](http://www.tellium.com)

## Geyser says SONET needs some 'give'

Start-up's optical switch gives users low jitter and carriers the ability to oversubscribe.

BY DAVID ROHDE

**DENVER** — Ever wish you could change history and force the people who decided T-3 carrier networks would run at 45M bit/sec to talk to the people who decided Ethernet would run at 10M bit/sec and 100M bit/sec and work out something more compatible?

The people at Geyser Networks have shared the same fantasy.

The latest start-up of broadband network legend Wu-Fu Chen says it's pointless to ask service providers to abandon their traditional method of wrapping 45M bit/sec T-3 connections into self-restoring 51M bit/sec SONET frames just because it potentially wastes so much bandwidth as Ethernet breaks into the wide area.

Instead, Geyser has developed an optical service switch that efficiently

packs enterprise networks' LAN traffic flows into SONET metropolitan transport networks, giving service providers

a chance to boost circuit utilization and potentially reduce prices.

The OSM 4800 Optical Services Manager, demonstrated recently at the National Fiber Optics Engineers Conference, uses what Geyser dubs FlexBand technology to concatenate — or lash together — relatively small chunks of SONET transport on the fly to give users the ability to send bursty traffic over a shared metro infrastructure.

That means service providers can do in ultrabroadband metro networks what they've done in long-haul packet networks like frame relay to keep prices down — "oversubscribe," or let users share bursting ability while retaining the feel of a dedicated pipe.

By retaining such traditional features as SONET add/drop multiplexing, Geyser  
See **Geyser**, page 42

### Jumping around SONET

Bandwidth flexibility can be difficult to achieve in SONET because it's based on the following increments:

Optical Carrier level	Electrical equivalent	Line rate in bit/sec
OC-1	STS-1	51.84M
OC-3	STS-3	155.52M
OC-12	STS-12	622.08M
OC-48	STS-48	2,488.32M
OC-192	STS-192	9,953.28M

## Michael Zadikian speaks of grand optical plan



Plenty of people have optical networking fever these days. But you've never seen a case of it like the

one that's bit Michael Zadikian.

This 19-year network industry veteran — an ex-Cisco executive who later sold optical transport equipment firm Monterey Networks to his former employer — has started up four optical network companies this year along with partner Zareh Baghdasarian. What's more, Zadikian serves as either CEO, chairman or co-chairman of them all, even though the companies are headquartered in Texas and New Jersey, and he lives in California.

Zadikian, whose companies have attracted more than \$50 million in first-round funding from some of the biggest names in venture capital, has a grand vision for how optical networks will evolve and what that will mean to corporate networks. He spoke recently with Net-

work World News Editor Bob Brown.

How would you describe the first phase of optical networking?

The first phase was all about inventing basic [dense wave division multiplexing] and advanced componentry and achieving  
See **Zadikian**, page 42

### Optical empire in the making?

Michael Zadikian is tight-lipped about exactly what his four companies' plans are, but here are the basics:

#### COREE

**Based:** Red Bank, N.J.  
**Founded:** July  
**Business focus:** Highly scalable core packet switching systems for optical data nets.  
**Funding:** Undisclosed

#### LATUS LIGHTWORKS

**Based:** Richardson, Texas  
**Founded:** March  
**Business focus:** Optical long-haul network products.  
**Funding:** \$28.1 million from Mayfield Fund, Sevin Rosen Funds and others.

#### IRIS LABS

**Based:** Plano, Texas  
**Founded:** Unavailable  
**Business focus:** Intellectual property and software related to optical and data networks.  
**Funding:** Undisclosed



#### METERA NETWORKS

**Based:** Richardson, Texas  
**Founded:** January  
**Business focus:** Optical metropolitan network products.  
**Funding:** \$24 million in first-round financing from Sevin Rosen Funds, Mayfield Fund and others.



# Avici Systems prepares for growth

Terabit router firm inks partnerships for service and support following successful IPO.

BY JIM DUFFY

BILLERICA, MASS. — Fresh off its successful IPO, Avici Systems last week announced two more initiatives in an effort to gradually build itself into a full-service supplier of high-speed routers for the Internet core.

The small, young company that went public in late July disclosed two partnerships designed to offer customers some of the benefits they currently receive from bigger companies. The first is a service and support alliance with IBM Global Services. The second is a technology integration pact with Dorado Software, a developer of operational support system (OSS) software for carriers.

"It's very important," says Kevin Mitchell, an analyst at Infonetics Research in San Jose. "From our research, we actually measure how service providers select manufacturers, and service and support capabilities is either No. 1 or No. 2" in their criteria. "It's

## Growth enhancers

**Avici's latest steps in establishing itself include:**

**Expansion of customer service and support:**

- Partnership with IBM Global Services.
- Group of 20 dedicated people reporting to head of customer service.

**Partnership with Dorado Software:**

- Integration of Avici CLI and SNMP management with operational support systems.
- Avici Element Management System now supports provision, as well as configuration and device management.

right after product reliability if it's No. 2."

Under the IBM arrangement, IBM Global Services will service and support Avici's Terabit Switch Router (TSR), a router that Avici says can scale to tens of terabits. TSR is designed to support up to

2,240 OC-48s or 560 OC-192 connections.

IBM and Avici will provide TSR product installation and maintenance, integration support and network deployment and management. IBM will assist Avici's 20-employee service and support staff, which is managed by Vice President Jim Graham, a former Amdahl executive.

Avici sales and services offices in Boston, Dallas, Denver, San Jose and Reston, Va., will be able to recruit IBM Global Services for technical assistance, card swaps and in-field diagnostics, according to Pete Chadwick, Avici vice president of product management.

IBM Global Services plays a key role in IBM's \$2 billion alliance with Cisco to migrate IBM customers to Cisco network products.

Under the Dorado Software arrangement, the companies will develop TSR element management software (EMS) for TSR customers. The software will be available early next year, Chadwick says.

The Avici EMS will be designed to integrate with carrier OSSes and dynamically provision new services across optical networks, Chadwick says. Avici management functions consist of TSR configurations through a command line interface and SNMP device status monitoring.

These will be combined with Dorado's Oware develop-

ment framework and RedCell application suite to provide a graphical system for subscriber management, service provisioning and assurance, as well as performance, security and topology management.

"I don't know much about them," Infonetics' Mitchell says of Dorado, "but service providers spend millions of dollars on the OSSes so they want to be able to hook other things into it and be able to provision things much easier. Service provisioning and rolling out new products is one of their top technical challenges." ■

**Zadikian,**  
continued from page 41

ing new optical performance levels of distance and bit rate. It was about getting optical amplifiers to work. Then, companies like Monterey, Sycamore and others began looking at intelligent ways of creating networks out of these new optical technologies instead of settling for point-to-point solutions.

## Where are we headed now?

The next frontier is melding IP and data technology with optical technology. The industry is also looking to really up the channel count to the next level. We're talking about hurling multiple terabits per second over distances of 3,000 kilometers or more without the need to regenerate signals electronically.

**It's clear that optical network advances are changing the way carriers build their networks. But how has this affected their customers?**

The biggest manifestation has been that long-distance voice prices have dropped through the floor. What's coming is the ability for service providers to deliver bandwidth services not just at OC-3 or OC-12, but at OC-48 and OC-192 as well as at one and 10 Gigabit Ethernet. They'll also have the ability to restore those services from fiber cuts intelligently. The problem for the customers is: What do you attach those types of links to? A Cisco GSR or what? The issue here is that boxes like the GSR were designed for backbone functions, not for handling managed VPNs or firewall or access services, so that's where there

might be an opportunity for new equipment suppliers.

**What's the thinking behind creating four optical network companies at once? Will their stuff work together?**

There will be commonalities, but you won't need to use their technologies together. Three of the companies are systems makers, the other is focused on intellectual property and software [see chart, page 41]. While there is lots of action in the start-up area today, the problem for customers is that they are essentially R&D farms for the big players to buy. That's fine, that's one model. The claim is that at the end of the day all the pieces that the big players buy are going to fit together and create an end-to-end solution. But the reality is that the pieces don't work together and can't be managed from the same place. Integration efforts are significant and usually unsuccessful. And the new but now public start-ups themselves aren't really in a position to buy up other companies and piece them together — it's taken a company like Cisco years to get that system down. We like to think there is a better approach and that's what we're doing.

**How does someone serve all the roles you serve with your new companies and still have a life?**

I enjoy myself. I work 55 to 60 hours a week, which isn't abnormal these days. I find the variety to be fun. I'm in the depths of architectural issues of chips and exploring the next optical performance problems, then switch gears to recruiting and interacting with attorneys the next day. ■

**Geyser,**  
continued from page 41

enables local carriers to maintain their current methods of circuit rerouting around failures and support for real-time voice and video over time-division multiplexing.

Geyser is being cagey about what the OSM 4800 will cost. Because the box supports dense wave division multiplexing for boosting optical horsepower and Multi-protocol Label Switching for integration of IP and ATM traffic, the switch is expected to be sold for carrier-edge and core networks. For smaller service providers that could mean a price that puts it "out of their league," according to a recent report from analyst firm Current Analysis.

Geyser officials say they're largely going after service providers that earlier committed to expensive SONET electronics.

"Our value proposition is not to take all of that, throw it away, and start all over," says

Kent Novak, Geyser's vice president of marketing.

In hardware, the OSM 4800 performs a concatenation of SONET-standard 1.5M bit/sec "virtual tributaries," and this so-called N-times-virtual tributaries concatenation does not need to be fixed in advance for each customer. Geyser officials claim their box checks traffic flows every millisecond to determine whether the number of virtual tributaries needs to be expanded or contracted for each customer, sending a message through the SONET overhead to the other switches on the network.

The idea is to avoid the typical low average circuit utilization in SONET — 5% to 10% in the access network and 20% to 30% in the core, according to Geyser. Using the OSM 4800, a 10M bit/sec transparent LAN service would require seven virtual tributaries connections. This way, "you don't have to take a 10M bit/sec service and put it inside a 45M bit/sec circuit and waste 77% of the traf-

fic," Novak says.

Users also benefit in that the virtual tributaries are provisioned dynamically. The constant reassessment of traffic flow means low jitter — or variation in delay — thus accommodating voice and video traffic between the SONET endpoints.

"Low jitter and dynamic allocation of bandwidth support a broad range of services," says Andrew McCormack, senior analyst at Aberdeen Group in Boston.

Geyser: [www.geysernet.com](http://www.geysernet.com)

[www.nwfusion.com](http://www.nwfusion.com)

## A SUPER SONET

Get an introduction to the FlexBand technology with a white paper from Geyser Networks.

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## Briefs

ValiCert last week announced Document Authority, a Windows NT- or Unix-based server software package for creating an electronic document repository that lets businesses share sensitive documents over the Web using digitally signed and time-stamped receipts. The software, also available as a service from ValiCert, starts at \$100,000. ValiCert also debuted Financial Express, middleware designed for use in the banking industry's emerging Indentrus online financial services initiative. That software also starts at \$100,000.

ValiCert: [www.valicert.com](http://www.valicert.com)

IBM and BroadVision say they will work to enable BroadVision's One-to-One e-commerce application suite to run on IBM's RS/6000 servers. They will also extend the BroadVision application to work with IBM's DB2 and WebSphere for Enterprise JavaBeans programs. Under the agreement, IBM will provide technical assistance, and BroadVision will establish a worldwide practice for the training of IBM Global Services personnel and IBM Business Partners.

Microsoft last week released a new version of its Windows Media Player 7 designed for the small screens of handheld computers. The new software plays MP3 and Windows Media files on the Hewlett-Packard Jornada 680/690/820, NEC MobilePro 780/880, Sharp Telios HC-VJ1C/HC-AJ2 and Vadem Clio C-1050 handhelds. Users can also transfer files from handheld to PC with a built-in mechanism. With the new players, companies can offer training audio and video that can be easily taken on the road for use anytime.

Microsoft: [www.microsoft.com/windows/windowsmedia/](http://www.microsoft.com/windows/windowsmedia/)

## Start-up, EDS join for Web site testing

BY CAROLYN DUFFY MARSAN

AUSTIN, TEXAS — Tonic Software has snared its first customer: Electronic Data Systems, which last week announced a multimillion dollar deal to host the Web applications management tool developed by the Austin, Texas, start-up.

Electronic Data Systems (EDS) Web Hosting Services will offer Web site performance testing, monitoring and scalability assessment services based on Tonic's software. The services initially are geared toward the 600 Web sites that EDS hosts, but eventually EDS will offer one-time and regular assessments to any Web site.

The EDS deal is a coup for Tonic, a 10-month-old, venture-funded company launched by former executives of IBM's Tivoli Systems group. Tonic introduced its first product in May.

Tonic's software, which runs on a Windows NT server, models the complex ways in which end users interact with a Web site. For example, it can measure the performance an end user will experience at an e-commerce Web site when that person orders products using services such as credit card verification that are



EDS will use Tonic Software's latest offering to test and monitor customers' Web sites from management centers such as the one shown here.

hosted on third-party sites.

Web site operators can use Tonic's tool to determine how many concurrent users a site can handle before crashing as well as provide ongoing performance monitoring of the site.

"In the old days, you had a human buffer between your IT department and your customers. But nowadays, your customers are interacting directly with your

organization's IT department over the Web," explains Steve Marcie, chief technology officer at Tonic. "Our technology gives you insight into how your Web applications actually function."

Tonic's software helps IT managers identify Web applications problems before they occur, determine the cause of the problems and correct them. These features

See EDS, page 46

## New search engine promises real answers

BY JASON MESERVE

WASHINGTON, D.C. — A new breed of search engine companies is looking to redefine the way we find electronic information by returning answers to questions rather than a list of possible documents containing answers.

One of the companies helping define the category is AnswerLogic, which last week introduced its answer engine dubbed AE1. The engine, which will be initially offered as a hosted service, uses topic-specific lexicons to categorize information on a Web site.

AE1 uses a natural-language processor to learn the content of a document and to understand the meaning of a question entered into its search box. This allows questions to be asked that do not necessarily contain the same words that could appear in a correct answer.

"The benefit of a natural-language approach is that you get performance

superior to regular keyword searches," says Jackie Fenn, a vice president at Stamford, Conn., market research firm Gartner Group. "You're taken to the exact location in the document, not just to a document that may contain an answer."

AnswerLogic will first target the IT and financial services markets with the

service as well as with future enterprise editions of the software.

Khera Communications of Rockville, Md., will soon be using AE1 on its More-Business.com Web site as a virtual small-business advisor, says CEO Raj Khera. "The [virtual] small-business advisor will be for users that want specific answers for questions like 'Where do I go for venture capital funding?'" Khera says. "Getting an answer will be a lot better than getting the list of documents [from More-Business.com] that could contain an answer."

Khera says his company will retain its current site search engine and compare how the two work together.

The hosted AE1 service is available for a base price of around \$5,000 per month. During the first quarter of next year, the company will offer a site license priced between \$250,000 and \$500,000.

AnswerLogic: [www.answerlogic.com](http://www.answerlogic.com)

www.nwfusion.com

## THE TROUBLE WITH SEARCHING

Forrester Research published a report called "Must search stink?"

Read the firm's comments and find out the difference between answer engines and search engines.

DocFinder 9926 online



'Net Insider . Scott Bradner

## A TELECOMMUNICATIONS MURDER/SUICIDE PACT?

**A**ustralia has a right to be ticked off. The country can't get anyone to help it pay for its international Internet connections — Australian ISPs

have to pay the full cost themselves. This is quite unlike the telephone world, in which Australian service providers only have to pay for half of

each international link. But what the country has gotten an ITU study group to do to fix the problem seems to be a relatively efficient way to commit technological suicide.

Early this year, Australia asked the International Telecommunication Union Telecommunication Standardization Sector study group 3 (SG3) to look at the problem of what that country sees as an imbalance in who pays for international Internet links. Specifically, the country requested that "the development of charging, accounting and settlement principles for services using the Internet Protocol be included in SG3's work program for 2001 to 2004."

But apparently SG3 decided that the problem was a simple one and, after a single meeting, proposed a recommendation that will be voted on during the World Telecommunication Standardization Assembly at the end of September in Montreal. The proposal is deceptively simple.

"Noting the rapid growth of the Internet and Internet-based international services: It is recommended that administrations negotiate and agree to bilateral commercial arrangements applying to direct international Internet connections whereby each administration will be compensated for the costs that it incurs in carrying traffic that is generated by the other administration," the proposal says. (The recommendation and supporting documents are at [www.wia.org/icaais/](http://www.wia.org/icaais/).)

Basically, this means if you own an international Internet link, then you can demand that anyone who generates traffic that traverses your link must pay you

for transporting the traffic. Actually, the proposal says the source ISP, not the original source, must pay.

Technically, this would be enough of a challenge. You would have to monitor the source addresses of all the traffic on your link and determine which of 5,000 ISPs to send a bill to and figure out how to send a bill to that mom and pop ISP in Lithuania. But generally the source of Internet traffic is not the same as who requested the information. So if I wanted to watch Internet coverage of the Olympics, you would send a bill to some Australian ISP. Since I assume the source ISP would pass on the bill, why, under this regime, would anyone let their traffic go over your link, unless it's something of high value such as pornography?

The inescapable result of any link owner attempting to impose such a regulation would be that the country on the end of the link would be cut off from most Internet content. This seems a sure way to marginalize that country. Australia is pushing this proposal. I guess the country sees an advantage to being marginalized.

The U.S. government, and a number of other countries' governments, has strongly opposed this attempt to impose dying telephone-based regulations on the Internet. For the sake of Australia and other countries like it, I hope the opposition is successful in killing the proposal.

Disclaimer: Whatever happens, Harvard is in no danger of being marginalized, but the university has not expressed an opinion on this issue.

*Bradner is a consultant with Harvard University's University Information Systems. He can be reached at [sob@sobco.com](mailto:sob@sobco.com).*

get certain.



### EDS,

continued from page 45

attracted EDS, says Gary Lerew, vice president of EDS Web Hosting Services.

"The Tonic tool allows us to go in and see exactly where the bottleneck is at a very granular level," Lerew says. "Where this product adds the most value is where sites are moving to and conducting business on the Internet. It's the e-commerce sites that need to have tools and capabilities" for performance monitoring, he adds.

EDS Web Hosting Services will introduce Tonic-based services this fall, and the EDS Internet Application Development group has adopted Tonic as part of its toolbox for developing Web applications. EDS sees potential for selling Tonic services to public and private Web sites.

"There's certainly an increasing demand for Web site testing to be done as a hosted service," says Dick Heiman, a research director at Framingham, Mass.,

market research firm IDC. Heiman says he hasn't seen another application like Tonic's, but several vendors are offering hosted stress- or load-testing services.

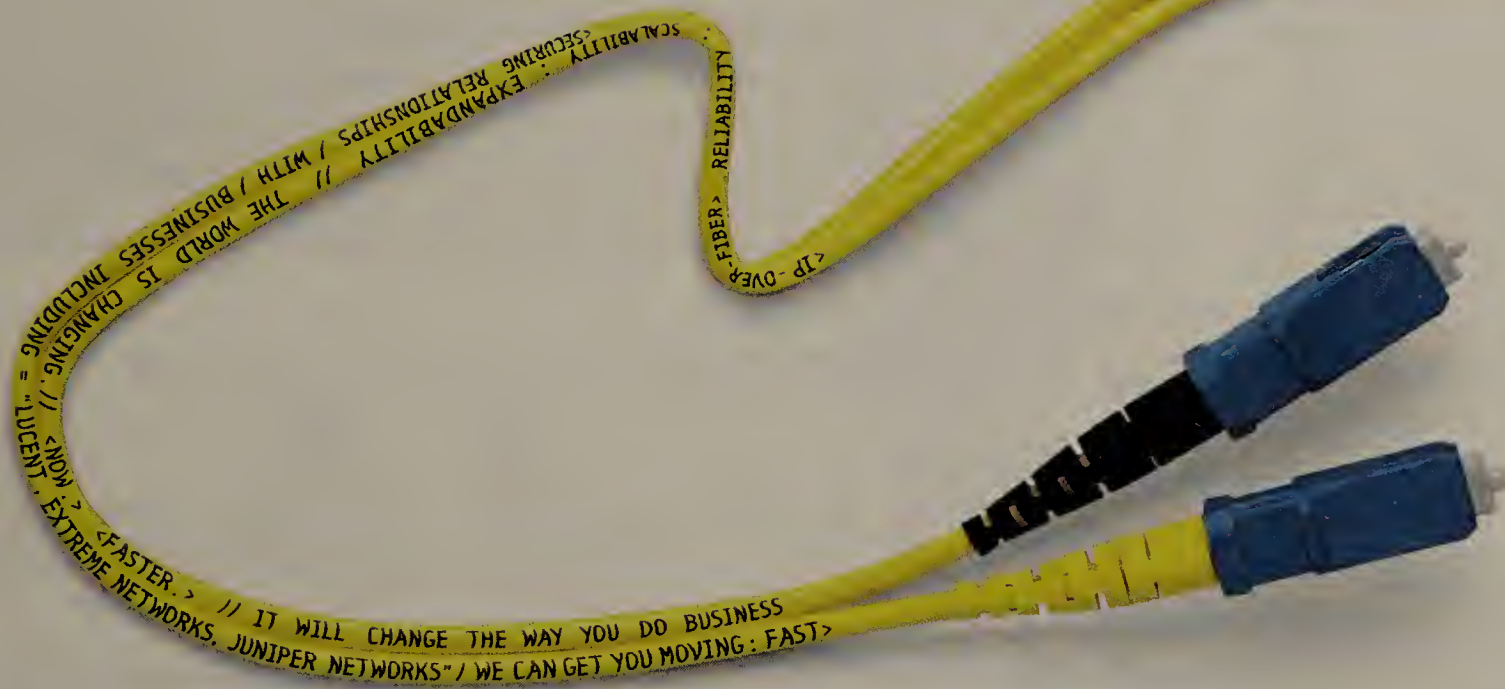
"There's great demand for companies to roll out new Web applications faster and faster. And the exposure from these applications is greater than ever. . . . If your application fails, you end up on the front page of *The Wall Street Journal*," Heiman explains. Companies are "looking for help in doing testing."

In late August, Tonic shipped Version 1.6 of its software, which includes a Java-based graphical user interface as well as an HTML interface for remote dial-in. Version 1.7, due in October, will add parsing technology to verify that all the dynamically generated parts of a Web page appear as they should.

Tonic is sold on a monthly-fee basis depending on the number of Web servers being monitored. It starts at \$650 per month for a single-processor server.

Tonic: [www.tonicsoftware.com](http://www.tonicsoftware.com)





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# Don't overlook security in ASP selection process

BY MICHAEL MARTIN

**B**y most accounts the application service provider market is set for explosive growth. Framingham, Mass., market research firm IDC predicts that in 2004, ASPs will rake in \$7.7 billion in revenue — more than 25 times the \$300 million they earned last year. If ASPs are going to succeed, there are several hurdles that must first be overcome, including corporate fears about information security.

Such fears are understandable. After all, if a business moves its internal IT operations to an ASP, mission-critical data will have to reside at the ASP's facilities, outside the direct control of a company's IT staff. Also, to retrieve information from an ASP's data center, or store new information on a server housed by an ASP, data will potentially have to travel across public networks where it could be intercepted.

Companies are right to be concerned about ASP security, according to Tom Welch, a vice president for JAWS Technologies, a Toronto firm that assists ASPs in developing security policies. While large ASPs tend to have good security policies and practices, Welch says some smaller ASPs don't provide enough security.

"There are a lot of 'mom and pops' who want to get into this industry. They don't invest in secure infrastructure, and they're going to take a hit that will be bad for the whole industry," he says.

In addition to firewalls and VPNs, Welch believes strong authentication is a key component of any ASP security scheme. The more important the data an end user is accessing, the stronger the authentication should be, he says.

Ultimately, security is such an important issue for ASPs and their customers that Welch believes it will become a key market differentiator.

Two of the largest ASPs, USInternetworking and Corio, share Welch's opinion about security setting an ASP apart from the competition.

Ron Freedman, a vice president at USInternetworking, says his company's Total Security Architecture is always part of USInternetworking's pitch to potential customers.

"We've determined that to differentiate [USInternetworking], we have to go above and beyond what I would call generally acceptable security principles," he says.

Freedman explains there are two critical areas in any ASP security scheme: the data center and the network.

For its data centers, USInternetworking employs

**APPS OUTSOURCING**  
**Authentication, third-party auditing should be key considerations in picking an application service provider.**

## ASP security layers

Depending on the importance of the information being transmitted, ASP security can include authentication, VPN, firewall, antivirus and intrusion-detection technology.

### Authentication

When a user attempts to gain access to an ASP data center, the user is asked for a name and password.

### VPN

Communications between the user and ASP data center travel over an encrypted tunnel.

### Firewall

Prevents unauthorized users from gaining access to the data center.

### Virus scanning

The ASP constantly scans for any viruses that may worm their way on to its network.

### Intrusion detection

ASP staff monitor traffic for any unauthorized activities.

One client that worked with USInternetworking to ensure there were no attacks on its USInternetworking-hosted servers was hpshopping.com — a subsidiary of Hewlett-Packard that sells the parent company's products directly to consumers online.

"[Distributed denial of service] is something we talked to USInternetworking about, and they had several methods of dealing with these kinds of things," says Don DeBold, hpshopping.com's director of technical operations.

USInternetworking increased its monitoring capabilities to look for any activities that could have been associated with distributed-denial-of-service attacks. DeBold adds distributed-denial-of-service attacks can't always be prevented, so in case a successful attack did take place on a USInternetworking customer, the ASP had response procedures in place to minimize any damage.

To guarantee its security policies and procedures remain effective,

USInternetworking uses an internal group of vulnerability personnel to test the equipment every month. Once every calendar quarter, USInternetworking brings in a third party to conduct a vulnerability assessment, which includes ethical hacking.

Mark Milatovich, manager of the security group at Corio, believes third-party testing is essential if an ASP wants to make sure its security policies are effective. He also notes that the results from third-party tests can be used to reassure potential customers.

Hpshopping.com's DeBold says third-party certification from Ernst & Young played a role in his company's decision to have its operation hosted by USInternetworking.

"We knew an objective third party had reviewed their processes and assured they met a certain minimum standard for protecting the integrity and confidentiality of our customers' data," he says.

In the near future, Milatovich believes ASPs will begin offering security services so customers can ensure their sites are as secure as their ASPs'. The service providers have put a lot of work into developing security methodologies, and there's no reason these methodologies can't also apply to businesses, he says.

Most USInternetworking clients wouldn't dispute that the ASP's security is tighter than their own, Freedman claims.

"When we talk to customers about our Total Security Architecture, nine times out of 10, they walk away saying, 'You guys do a better job of protecting our data than we do ourselves,'" he says. ▀



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# Technology Update

An Inside Look at the Technologies  
and Standards Shaping Your Network

## Ask Dr. Intranet

By Steve  
Blass

Are there any  
PC Card token-  
ring adapters  
available for the  
Macintosh? Also, is it  
possible to connect  
an iBook (with only  
10/100M bit/sec Ethernet and  
Universal Serial Bus connec-  
tors) to a token-ring network  
with some kind of converter?

Madge makes 16- and 32-bit PC Card token-ring network interface cards for which Macintosh drivers are available. You can find information on these at [www.madge.com/connect/Products/Adapters/](http://www.madge.com/connect/Products/Adapters/). Using a PC Card token-ring card is the easiest way to connect your iBook to a token-ring network. Ethernet and token-ring networks are quite different, and it takes more than a simple converter to switch between them. The Token Ring FAQ from the comp.dcom.lans.token-ring newsgroup, at [www.landfield.com/faqs/LANs/token-ring-faq](http://www.landfield.com/faqs/LANs/token-ring-faq), explains: "There is no 'converter' that allows an Ethernet network and token-ring network to communicate between each other. A conversion process must occur between the two topologies. There are two methods to accomplish this 'conversion': bridging and routing."

Bridging connects two networks at the data link layer (Open Systems Interconnection Layer 2) and creates a single logical network. Routing connects networks at OSI Layer 3 and separates physical networks into separate logical networks. Routing is the most common interconnection method.

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## Solid-state disks can speed storage

BY RAMON SANDOVAL AND  
MANEESHA LEE

Gigabit Ethernet and emerging multigigabit technologies can move data at tremendous speeds but are often unable to achieve these speeds because of bottlenecks at the storage devices. Typically, a request for data can arrive at a server or storage-area network (SAN) device, which then performs the lookup from system memory or from a cache on the storage controller, and returns the necessary data from the cache.

If the data does not reside in the cache, it is read from a storage device (typically a hard drive, although the data may also reside on a CD or DVD device). The latencies involved in performing disk-related processes create a significant bottleneck to full network performance.

On average, more than 50% of I/O traffic is caused by just 5% of system data. Data-centric companies are learning that by moving these heavily accessed "hot" files onto a solid-state disk (SSD), read/write operations are performed at RAM speed. Commonly, these hot files include temp, log and swap files; tables and indexes; and logon information. Immediate results are evident in better terminal response times, faster queries, and quicker completion of batch jobs.

SSDs shatter I/O bottlenecks and provide data access hundreds of times faster than rotating disk storage. The I/O bottlenecks caused by multiple users trying to simultaneously access data on hard drives hinder system performance, delaying subscribers' access to e-mail, e-commerce, searches and the like.

SSDs are high-speed, random-access storage peripherals used to accelerate database applications. Even with today's faster-access rotating disks, more than 90% of the time taken to transfer a 4K byte block is used to move the head and rotate the disk. SSDs have no mechanical movement and therefore can respond much faster. Even the fastest magnetic storage device can only access data at rates of eight to 13 milliseconds. SSDs can access stored data more than 300 times as fast.

Additionally, where magnetic storage devices only achieve between 75 and 125 I/O operations per second, SSDs can deliver up to 4,000 I/Os per second depending on the application.

A significant impact on network performance can be achieved by putting only a relatively small portion of files onto SSDs.

Often, mounting 5% or fewer of the files on an SSD is enough to realize the desired performance improvement.

SSDs commonly store temporary tables, transaction logs, redo logs, indexes and index tables. The size of these files will increase as the size of the overall database grows.

Rick Westerman of IT research firm Meta Group in Stamford, Conn., estimates that database file sizes will increase at a rate of 100% annually for the next few years. He also believes in many cases these

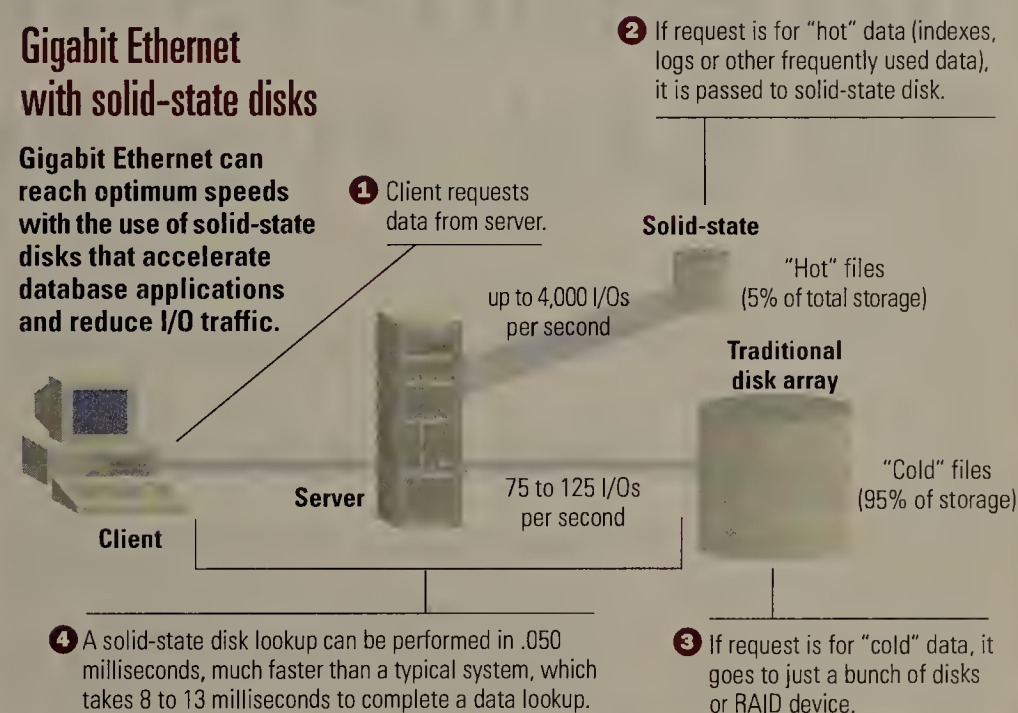
caching requires the use of CPU cycles. This can potentially impact server performance by tying up the CPU for cache lookups. SSDs can be multiported and clustered, letting one SSD support multiple servers, potentially relieving multiple CPUs of such lookup functions.

Drive controllers with integrated caches pose a number of problems. If the controller caches disk writes, it is possible for the data to be lost before it is written to the hard disk. Data written to an SSD is immediately stored, reducing the

## HOW IT WORKS

### Gigabit Ethernet with solid-state disks

Gigabit Ethernet can reach optimum speeds with the use of solid-state disks that accelerate database applications and reduce I/O traffic.



files belong on SSDs. System performance improvements of 200% to 400% can be realized by adding an SSD to a RAID array.

Recent developments in SSD and Intelligent Cache Device technology offer significant improvements in performance. For example, some telecommunications, Internet, banking and financial trading industries running Oracle, Sybase and Informix use this new performance-tuning technology to great advantage. Applications that benefit most are relational databases, e-commerce, e-mail servers, Usenet newsgroups, authentication servers, billing systems, decision support and fraud detection.

Although system memory or cache on the drive controller or controllers can also be used to provide fast access to data, both have significant limitations when compared with SSDs. System memory

risk of data loss. Furthermore, SSDs are more suitable for use in critical data applications — such as those that maintain ongoing transaction logs — than controller caches because data is immediately stored on the SSD.

With the move toward Gigabit and multigigabit Ethernet, the necessity of reducing potential performance bottlenecks becomes critical to achieve the transaction speeds that these new standards can potentially deliver. The use of an SSD, which holds "hot" files and intelligent cache, will go a long way toward minimizing storage bottlenecks.

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# THE *CABANA GUY* INTERRUPTS THIS VACATION TO SAY, "IT'S FOR YOU."

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Gearhead . inside the network machine . Mark Gibbs

### DHCP – PROBLEMS, RESOURCES

Last week we started into the mysteries and magic that underlie Dynamic Host Configuration Protocol. This week, before we get back into the

topic, Gearhead believes we have solved Gibbs' problem with his HP Pavilion 8485Z.

Gibbs had switched off the hardware

acceleration and found that the video lock-up problem apparently stopped. Gearhead, in a moment of idle fooling around, and with a whisper from the hardware gods, tried something else. We changed the refresh rate from the default for the screen to the default for the built-in ATI graphics card, switched hardware acceleration back on and

voila! No problems yet.

If you, gentle reader, should have even the vaguest explanation of why this should work (and note that the explanation must not include references to moon phases, lay lines or metaphysical forces), Gearhead would be most interested in knowing.

Anyway, back to DHCP. We discussed the basics last week, and this week we dive in slightly deeper by tackling a common DHCP problem.

Let's assume you have set up your DHCP server (Windows NT, NetWare, Unix) and things aren't right. A machine can't get on, complains that its address is being used — the kind of stuff that just ticks you off.

Some (older) DHCP servers do not test IP addresses to see if they are in use before assigning the addresses to clients. Testing lets the server detect "rogue machines" that may have hijacked IP addresses before an IP address conflict could occur. Run an IP address scanner to see if you have conflicts (you should preferably use a computer with a static IP address to minimize potential problems), and check the DHCP server's log.

A conflict could easily occur if, as we discussed last week, you have redundant DHCP servers at either end of a WAN connection. If the servers handle what is, effectively, one address space that can be allocated even if the link fails, when the link is re-established you could have the problem of duplicate allocation.

This particular problem is not something that is handled by any DHCP server Gearhead knows of and is easily cured by better network design — the wise choice would be to use subnets at either end.

Most of the problems you encounter with DHCP revolves around issues of network design. As always, good diagnostic tools will save your bacon.

Some resources for your DHCP delectation: First, DHCP.org at [www.dhcp.org/index.html](http://www.dhcp.org/index.html). Despite being a little long in the tooth, this is a repository of all the basics you need to know about DHCP. This site also points to the key requests for content for DHCP: RFC 2131 "Dynamic Host Configuration Protocol" and RFC 2132 "DHCP Options and BOOTP Vendor Extensions."

There is also a good frequently asked questions page at [www.dhcp-handbook.com/dhcp\\_faq.html](http://www.dhcp-handbook.com/dhcp_faq.html) (although it is dated 1998).

If you want to get down and dirty with code, check out the Internet Software Consortium's site at [www.isc.org/products/DHCP/](http://www.isc.org/products/DHCP/), wherein you will find freely redistributable reference implementations of a DHCP server, client and a relay agent.

*Next week: Who knows? Dynamically configure your thoughts to Gearhead at [gh@gibbs.com](mailto:gh@gibbs.com).*



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## Editorial

### The Web-hosting showdown lowdown

There wasn't a clear-cut winner in the Network World Web Hosting Showdown that I chaired last week at the Internet Commerce Expo in San Jose, but no one came out with egg on their face, either.



Which says something about the hosting market — it's young and booming and for now there is enough promise to float everyone's business plans, even if the bulk of today's hosting dollars are being spent with a few big firms like Exodus and UUNET.

After the vendors gave their opening position statements, IDC's hosting analyst Melanie Posey and I pestered the panelists, which included William

Yeack, executive vice president of professional services at Exodus; Sanford Brown, vice president and general manager of hosting services at AT&T; John Morgan, director of product and market strategy at Qwest Communications; David Rowe, director of services and strategy at Intel Online Services; and Mitch Ferro, director of hosting products at UUNET.

Posey and I noted, for example, that Exodus doesn't own a network and asked Yeack how this affects his cost structure and his ability to provide service-level agreements (SLA). He said it comes down to a build vs. buy decision and with the cost per DS-0 mile trending downward, Exodus can lease capacity just fine. For SLAs, the company simply has to architect the network to live up to its promises.

UUNET, on the other hand, touts its backbone as a competitive advantage. Ferro said they had one new customer in Atlanta that needed eight gigabits of capacity, and UUNET could provide it because the data center was on the backbone.

There were some good pointed questions when it came time for the panelists to question each other, but one area they seemed to agree on was the need for customers to shop for SLAs. For example, if scalability is important to you, Intel's Rowe suggests having your vendor spell out exactly how long it will take to add server capacity when you call to demand some more. Also, have them spell out the penalty for not living up to the agreement.

If nothing else, the crowd probably left impressed with some of the figures that Exodus' Yeack was throwing around: The company has 3,333 customers and houses 52,000 servers. The others have a long way to go to catch up. Check the session out at [www.nwfusion.com](http://www.nwfusion.com), DocFinder: 9929.

— John Dix  
Editor in chief  
[jdix@nwfusion.com](mailto:jdix@nwfusion.com)

Message Queue

### CLUSTER CONFUSION

"The benefits of a Windows 2000 cluster" ([www.nwfusion.com](http://www.nwfusion.com), DocFinder: 9869) is a good story with enough detail to capture the essential pitfalls. However, I am troubled that author Jeffrey Fritz leads us to believe that all of the combined systems are a "cluster." According to Microsoft, Network Load Balancing (NLB) is not supported on the same systems that are running cluster services — you are prevented from installing both on a single machine. If this is the case, then you don't really have a single cluster; you have one cluster for NLB and a second cluster that is running the true cluster services. I would like to see information on how these cooperate.

David Devouick  
Nutley, NJ

*Fritz responds: We tested the configuration designed and provided to us by Microsoft and Compaq. In it, NLB was used to balance the load to the three Web servers supplied in the configuration. In addition, there were two cluster servers whose specific job was to manage and balance the different cluster services.*

*You can find more information on how NLB and cluster service operate in Microsoft's "Network Load Balancing Technical Overview" ([www.microsoft.com/windows2000/library/howitworks/cluster/nlb.asp](http://www.microsoft.com/windows2000/library/howitworks/cluster/nlb.asp)). As the story mentioned, the Microsoft Deployment Planning Guide ([www.microsoft.com/WINDOWS2000/library/resources/reskit/dpg/default.asp](http://www.microsoft.com/WINDOWS2000/library/resources/reskit/dpg/default.asp)) has detailed information on deploying server clusters and NLB.*

### SETTING PRIORITIES

Just read your Aug. 28 issue. Exploited feature in Microsoft Outlook — page one ([www.nwfusion.com](http://www.nwfusion.com), DocFinder: 9870). Major security hole in leading encryption product — page 81 ([www.nwfusion.com](http://www.nwfusion.com), DocFinder: 9871). Hmm... It's good to see that there is no bias in technology-centric journalism.

Robert Padjen  
San Francisco

E-mail letters to [jdix@nwfusion.com](mailto:jdix@nwfusion.com) or mail them to John Dix, editor in chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.

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### EYE OF THE BEHOLDER

I totally disagree with Mark Gibbs' "Backspin" column "Plug-ugly interfaces down to the bone" ([www.nwfusion.com](http://www.nwfusion.com), DocFinder: 9872). What's ugly about Windows is not how it looks, but how it works. The Registry is beyond absurd, and it is the key to the instability of the Windows interface regardless of whether it runs on the CE, DOS (CP/M) or NT/00 kernel. The issue is not what the user sees, but what the user does not see.

If all people were exactly alike, then perhaps designing interfaces to match a single method would be a worthy goal. In reality, we all use computers in entirely different ways.

Why is Gibbs so concerned about silly stuff like what the graphical user interface looks like? I find users of Windows make it look all different ways and many just leave it as is without even a clue about editing menus and icons. Stuff like Window Blinds gets in the way of getting any work done and makes an absolute mess of screens and icons, not to mention causing third-party programs to fail altogether.

What is useful varies from person to person. What real computing always has been about is real data. Customers. Invoices. Transactions — lots of them at high speed and with 100% reliability. The Microsoft approach is taking us further and further away from this. That's what I don't like about Windows, not how it looks.

Jim Benfer  
Chairman and CEO  
MaxFrame  
Torrance, Calif.

The worst Windows programs on Earth are the ones in which the programmers think they have a better user interface than Microsoft's: Lotus Notes, Kai's Power Tools, PhotoSoap, Corel Draw and Coda's Finale, to name a few. These programs are impossible to use without using the help files and other associated documentation. They have nonstandard buttons and other user interface controls and don't use the right mouse button correctly. Some of them are Mac conversions written by Mac programmers. Some of them are linear function programs crammed into an event-driven interface.

Consistency is more important than prettiness.

Phil Daley  
Henniker, NH.





In the Works . Paul Hoffman

## IT'S OK TO LIKE ICANN, WARTS AND ALL

When people perceive that someone is performing a task incorrectly, they have a tendency to make fun of him and tell him how to do the job better. This tendency is magnified when the hapless object of scorn is a group that is supposed to govern. Because of this, the Internet Corporation for Assigned Names and Numbers (ICANN) will probably continue to suffer the eternal criticism of disaffected Internet users, given that its role in the Internet is widely misunderstood and what little it does, it does with lots of missteps.

ICANN was established in 1998 to oversee the Internet's name and address system. Since then, making fun of ICANN has become a national — and possibly worldwide — sport. Those participating come from all parts of the political spectrum and have varying views of the Internet. Unfortunately, those doing the criticizing rarely propose what ICANN should be doing, usually because doing so would expose their proposals to the criticism of other ICANN bashers.

ICANN is in the odd position of trying to limit its scope while dealing with complaints that it doesn't include enough people. Its major detractors say ICANN is not doing enough to get typical Internet users involved in policy decisions — as if there were any way to identify and contact all Internet users about their views. Worse, critics claim that ICANN should increase its involvement in making the Internet more accessible to people and assert greater control over Internet content. To do these things, critics contend, ICANN needs to be more representative of Internet users.

Regardless of how you feel about Internet access and content, it is absurd to think that ICANN could possibly make a difference in either area. ICANN, a U.S.-chartered nonprofit organization with about two years of history, has absolutely no standing with world governments. What country in its right mind would turn over its sovereignty to ICANN when ICANN says "Here is who you must let use



the Internet, and here is what they can and cannot say"? Anyone who demands that ICANN take on anything more than simple top-level domain name and IP address allocation misunderstands world politics.

This is not to say that ICANN is doing everything right. It has made some pretty dumb mistakes in recent months, and looks like it is about to make another huge blunder when it hands out monopolies to groups to control who gets into the top-level domain names.

Even so, there is probably no other group in the world that is better equipped to recover from its mistakes, given how much public scrutiny ICANN is under. ICANN's mistakes will continue to be very public, and hopefully the group will continue to improve. That's about the best we can expect.

*Hoffman is director of the Internet Mail Consortium and the VPN Consortium. He can be reached at phoffman@imc.org.*

Reality Check . Thomas Nolle

## THE SCRAMBLE TO SAVE VOICE OVER IP

If you threw all your black phones in the trash two years ago when the voice-over-IP and convergence hype was launched, you've probably long since dug them out and continued with traditional telephony. As the pages of this publication have shown over the past months, vendors are now touting voice over DSL, or "packet voice," as if IP voice were a dirty word. Has voice over IP really been rejected, or are we just learning that some of the things we expected from it were unrealistic?



We in the U.S. are accustomed to very good local-call quality, and long-distance quality that's nearly as good. With the steady drop in voice charges for traditional non-IP voice services, voice over IP's claim of significant cost benefits becomes less credible. How far can rates fall from a nickel per minute? And with the incumbent local exchange carriers' decision to deploy ATM in their access/DSL networks, voice over DSL really means voice over ATM, so the buildout of broadband access seems to be passing voice over IP by as well.

This isn't a failure of the technology but of our expectations. There was never a real chance that the U.S. public voice network would be redeployed using IP. Because that essentially dumb expectation was so publicized, we didn't glom onto some of the areas where real voice-over-IP potential exists. They won't justify the market hype, but they might save some vendors and venture capitalists.

One potential area is the cellular market. No

matter what people say on commercials, mobile phone voice isn't equal to wireline voice. Because the quality expectations of consumers are lower, cellular providers have more latitude to deploy IP voice. In addition, buildout of cellular networking is still ongoing, which means we wouldn't have to displace traditional equipment to adopt voice over IP — at least for new carriers.

Public interest in the "wireless Web" may also validate IP in the cellular market. If a significant number of wireless instruments end up with IP browsing and e-mail capability, the network that supports them would be more likely to be based on IP.

Stationary IP voice might be even better, and there's a play there, too. About 800,000 sites in the U.S. are candidates for an IP PBX or key telephone system in the next five years. Unfortunately, a key to success in this market is the ability to support standard phones and PCs as instruments for making calls. Vendors have all too often added all kinds of new IP gizmos to their offerings in the hopes of raising profits, but all they're doing is lowering their prospects for selling anything. We need to retune the IP PBX arena to accommodate market reality.

Even voice over DSL — or let's face it, voice over ATM — may offer some hope for the voice-over-IP camp. We're not going to be doing voice over IP over ATM, but we certainly could use the gateway controller products designed for voice over IP to support ATM-based voice calling. The media gateways, convergence switches, or whatever you want to call them are often IP-specific and thus unlikely to be used in wireline voice in the U.S. The gateway controllers that use IP not to transport voice but to connect controllers to the

media gateways are still a play. The IP-centric Internet Engineering Task Force's Media Gateway Control Protocol is now morphing into Megaco/H.248, an international standard that specifically envelops ATM voice networks in the gateway controller feature set.

There's even some hope for voice over IP in the toll network, in which regulatory and technology factors make ATM less interesting. The problem here is that long-distance calling isn't nearly as profitable as it used to be, and while there are more than 12,000 local-exchange Class 5 switches, there's only about one-tenth as many toll Class 4s that could be replaced. There seems to be almost that many voice-over-IP vendors! If all of them bet on this space, there's going to be a high body count.

We're not going to have a hundred-billion-dollar voice-over-IP market, but it's not going to be totally zero, either. In sectors such as gateway controllers, prospects might actually get brighter if new custom calling features begin to drive voice competition, because these features might be easier to create on the newer gateway platforms than on traditional voice switches. Smart voice-over-IP players are looking hard at one or more of these trends, and those smart players may be able to develop a survivable niche for themselves over the next two years. Not-so-smart ones are chaining themselves to the convergence anchor.

*Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (856) 753-0004 or tnolle@cimicorp.com.*



# OLDS

## Routine, remote disk defragmentation *can* save big bucks, help hardware upgrades

**M**any network executives are too busy with the complexities of managing their network to pay much attention to tactical matters such as disk performance. That could be a costly mistake.

BY  
DREW  
ROBB

"Corporations are losing as much as \$50 billion per year as a result of not defragmenting every server and workstation on the network," says Steve Widen, director of storage software research at IDC in Framingham, Mass.

IDC recommends deploying defragmentation software on Windows desktops and servers to avoid lengthy waits for file access, reboots lasting an eternity, hours added to backups and even corruption of data.

Granted, you can't always link system slowdowns to fragmented disk

drives. There could be a slow processor, not enough memory or even an old device driver. But where I/O pace or back-up speed has grown more sluggish over time, fragmentation is the likely culprit.

For instance, United Parcel Service (UPS) deploys Executive Software's Diskkeeper across a network that spans hundreds of servers.

"Defragmentation makes data access much faster and prevents degradation of system performance," says David Zhao, product manager in the UPS distributed systems services division in Atlanta, responsible for Windows NT design and infrastructure.

"Before, it was hard to tell between a network slowdown and a problem caused by poor server disk performance. As defragmentation removes disk performance slowdowns from the equation, network troubleshooting is much easier," Zhao says.

Some argue that you don't need to worry about defragmentation when you have file-based cache that bypasses disk access on commonly used files.

"Since memory access is at least 100 times faster than disk access, caching can significantly reduce disk I/O traffic and mitigate or possibly eliminate the second-order effects of file fragmentation," says Keith Walls, chief architect for InSoft Limited, a Hudson, N.H., consulting and development firm. However, the National Software Testing Lab, a software performance testing firm in Conshohocken, Pa., found that even with caching, slowdowns from disk fragmentation were far from eliminated. During testing of workstations and servers equipped with 128M bytes of memory, both performed significantly better after defragmentation.

### Throw hardware at the problem

Many network administrators consider regular system upgrades and hardware innovation sufficient to maximize network performance. "Hardware development is managing to stay one step ahead of storage demands," says Simon Perry, vice president of security solutions at Computer Associates. "As most



# Who needs a network defragmenter?

Fragmentation means that files are broken into multiple pieces rather than residing in one contiguous block on a disk. When a file is opened, the head must gather up the pieces to access the file. The user, therefore, experiences delays in waiting for files to appear. Also, newly created files may not find large enough blocks of contiguous free space.

If this occurs, they are written to the disk in a fragmented state. As free space and file fragmentation worsen, it takes longer to open files, reboot and back up files.

Anyone familiar with Windows 95 and 98 knows that the operating system comes with a built-in defragmenter. Although Windows NT never had such a tool, Windows 2000 does include its own manual "Disk Defragmenter."

So why do you need to buy a third-party application for your desktop, let alone the entire network?

First, the defragmenting utilities built in to Windows 9X and Win 2000 are fundamental and not equipped to defragment a badly fragmented system.

Essentially, these could be considered "lite" products. For home users, regular use of these tools will sometimes maintain the disk in good shape, provided the master table file, paging file (swap file on Windows 9X) and directories don't become badly fragmented. Once these system files fragment, however, it is virtually impossible for a lite defragmenter to properly defragment the disk.

The bad news is compounded by the fact that installing the operating system or a new application often rips these types of files to shreds.

Furthermore, when a disk fills up, it leads to extensive fragmentation of system files and directories. Once that happens, lite defragmenters can't cope and the system stays badly fragmented from that point forward.

To demonstrate the difference between a lite version and a fully network-capable tool, try the following:

1. Run the defragmenter built into Windows 9X or Win 2000.

2. Once completed, download a free trial defragmenter from Executive Software at [www.execsoft.com/downloads/menu.asp](http://www.execsoft.com/downloads/menu.asp) or Raxco Software at [www.raxco.com/products/downloadit](http://www.raxco.com/products/downloadit).

Both function on Windows 95, 98, NT and 2000.

3. Immediately run the defragmentation analysis. Print a copy and see what it tells you about the level of fragmentation. Check out the amount of fragmentation on swap file/paging file, MFT, directories and free space. Note also the amount of fragmentation that exists on regular files.

4. Now defragment the system, followed by taking care of directories and system file consolidation by running the program in boot-time mode.

5. Finally, run the analysis again, print it and see how it compares to original analysis. The system will be in much better shape than before as a result of a more thorough approach to defragmentation. Disk performance will have improved noticeably.

Where the need for enterprise defragmentation comes in is that NT doesn't have a built-in defragmenter, and Win 2000 comes with a lite manual version that cannot be used across a network.

"Disk Defragmenter [the built-in manual defragmenting utility in Win 2000] is not intended to be a tool for administrators to maintain networked workstations," states Microsoft in Knowledge-base article no. 254564. "This version is not designed to be run remotely and cannot be scheduled to automatically defragment a volume without interaction from a logged-on user."

Networkable defragmenters, however, can be run remotely from a system manager's desk, take care of fragmentation among all file types, and scheduled to run automatically across networks.

## Pricing information:

Executive Software's Diskeeper 5.0 for Windows 95, 98, NT and 2000: \$49.95 per workstation and \$229.95 per server ([www.execsoft.com](http://www.execsoft.com)).

Symantec's Norton Speed Disk 5.0 for NT: \$49.95 per workstation and \$249 per server ([www.symantec.com](http://www.symantec.com)). A Win 2000 version is in beta test.

Raxco's PerfectDisk 2000: \$44 per workstation and \$219 per server ([www.raxco.com](http://www.raxco.com)).

Prices vary depending on number of licenses purchased.

corporations change hardware every two or three years, they are largely unconcerned about fragmentation."

He notes that defragmentation technology has achieved only a 10% to 15% penetration into the corporate NT market so far, and that it lacks a compelling event such as the Melissa virus to make it a topic of discussion at the boardroom level.

Despite that, sales have been rising steadily in recent years. According to Reston, Va., marketing firm PC Data, U.S. corporations purchase close to one million defragmenter licenses each year. If sales continue to thrive, they could approach 50% enterprise desktop penetration within five years.

This growth is being driven largely by word of mouth. "NT fragments noticeably within a short period," says Bob Lofaso, Lucent's IT manager. "We experience a 15% to 20% performance gain on both servers and workstations by defragmenting our systems daily."

While the benefits enjoyed by Lucent may be substantial, according to IDC the total amount lost due to fragmentation is staggering. Analysts tallied up 'hard money' losses stemming from lowered productivity, help desk calls, increased IT staff costs and unnecessary hardware upgrades. When factored against the estimated 19.6 mil-

How'd they come up with the \$50 billion figure? Research firm IDC estimates that between 1997 and 1999, Microsoft shipped 19.6 million corporate licenses. If a fragmented disk slows a \$40-per-hour business professional by one-half hour per day, that's \$20 per day, about \$5,000 per year, multiplied by 20 million licenses, for a total of \$50 billion.



lion worldwide corporate licenses Microsoft shipped between 1997 and 1999, the total comes to more than \$50 billion per year. Put another way, defragmentation can cut total cost of ownership by \$350 per year per desktop.

"Desktop TCO will be dramatically lowered when a network defragmenter

is implemented," IDC's Widen says.

## The hassle factor

Despite these arguments, some wonder if defragmentation is worth the hassle. IDC analysts found that going from box to box to manually run defragmentation is impractical and cost-ineffective.

For example, on a 5,000-workstation, 25-server network, total staff costs would run as high as \$10 million if performed manually. When conducted remotely, however, IT costs fell to less than \$1,000 per year.

Even when licensing fees are factored in, the cost of maintaining a frag-

ment-free network comes to around \$90,000 per year.

That pales in comparison to the amount saved. As well as difficult-to-measure items such as increased user productivity, analysts put together a strong case built around deploying defragmentation software as a means of postponing or eliminating unnecessary hardware upgrades.

"Network defragmenters can save corporations \$6 billion per year by preventing unnecessary hardware upgrades," Widen says. "Defragmenters are rising sharply in popular-

**"We experience  
a 15% to 20%  
performance gain  
on both servers  
and workstations  
by defragmenting  
our system daily."**

— Bob Lofaso,  
IT manager, Lucent

ity as people realize they can often deliver comparable performance gains to hardware upgrades at a fraction of the cost."

Of course, there are many reasons companies will continue to need new and upgraded computers. It's unlikely that even the wild adoption of network defragmenting will greatly affect the \$311.5 billion spent annually on computer hardware. But as network managers become more aware of just how much of their performance and their budget can be recovered by keeping files consolidated, many more firms are likely to adopt networkwide defragmentation.

*Robb is a freelance writer in Los Angeles, specializing in technology issues. He can be reached at [drewrobb@mediaone.net](mailto:drewrobb@mediaone.net).*



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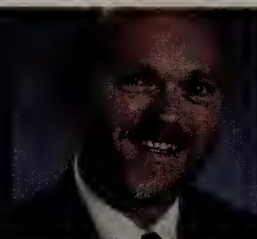
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# Drugstore Chain

## IMPLEMENTS

BY SHARON GAUDIN

# QoS

Jim Walker, senior network engineer at Longs Drug, uses quality of service to prioritize traffic.

**Longs Drug uses Cisco technology to set priorities for different types of traffic.**

**W**hile most companies are reluctant to start messing with traffic management schemes and instead throw bandwidth (and money) at their quality-of-service problems, Longs Drug Stores stuck its IT neck out and set up priorities and rules for applications racing across its network.

A few months after taking the plunge, joke e-mails and bulky downloads aren't slowing down high-priority traffic, and customer credit card requests are being handled faster than ever, says Jim Walker, senior network engineer for the nearly \$4 billion national pharmaceutical chain based in Walnut Creek, Calif.

"Before, employee e-mails were competing for bandwidth with debit and credit card purchases that needed to run through," Walker says. "Now I can slice the pipe up and reserve little pieces for some applications and then the remainder of the pipe is available. . . I no longer have people downloading Super Bowl commercials getting the same priority as credit card transactions."

Walker, who uses Cisco's Network Based Application Recognition (NBAR) feature in the 7000 Series router, says he can now guarantee that transactions made with debit and credit cards or checks will go through in less than 10 seconds.

"Before, I could not guarantee that," Walker says, adding that transaction time for customers making purchases at the company's retail outlets had varied. "If the machine has to wait, it will time out and [customers] will just leave. The final judgment of our service level is at the check stand. This is our customer's real contact with Longs Drug."

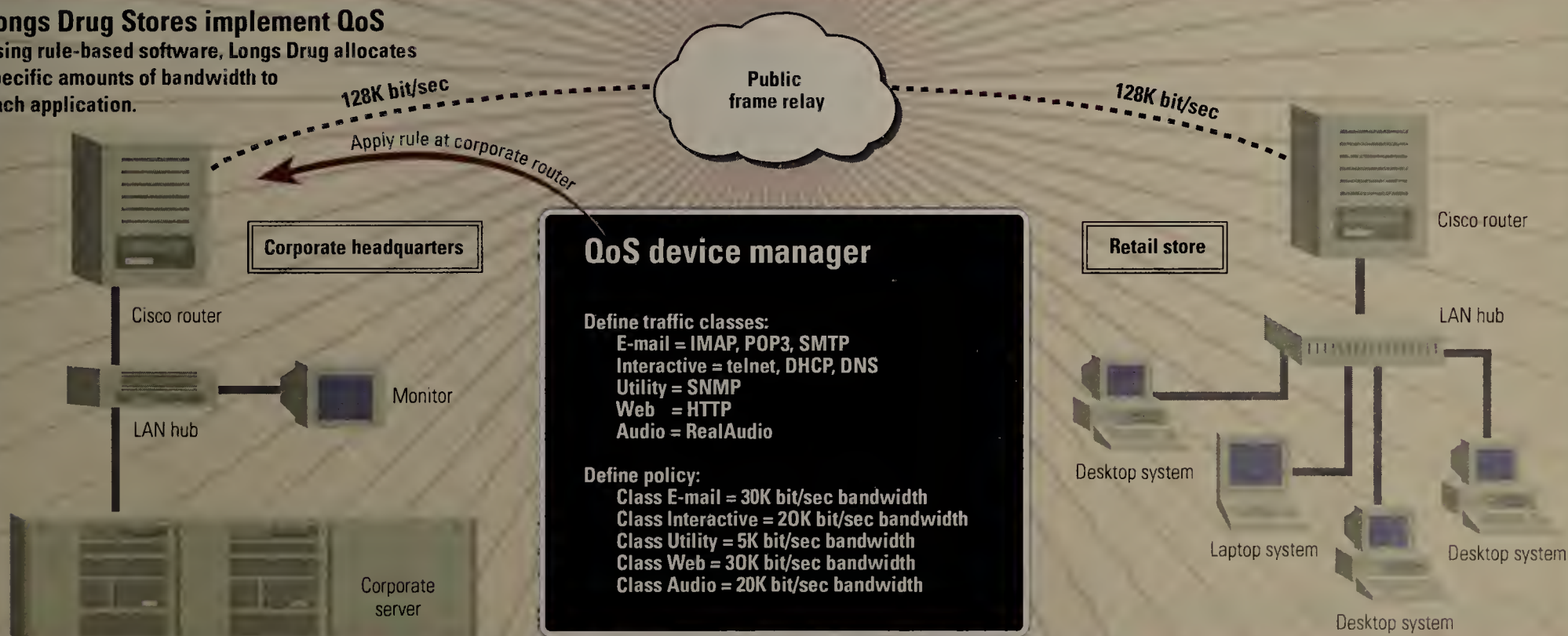
Longs' move to implement traffic policies is daring and rare, says David Passmore, research director at The Burton Group, an analysis firm in Salt Lake City.

"There aren't a whole lot of enterprises that we've worked with that are trying this," Passmore says. "It really has to do with the complexity. You'd have to be a rocket scientist to know what you're doing. . . You can end up making performance worse if you don't set it up properly. It's like giving people

**"...I no longer have people downloading Super Bowl commercials getting the same priority as credit card transactions."**

### Longs Drug Stores implement QoS

Using rule-based software, Longs Drug allocates specific amounts of bandwidth to each application.





enough rope to hang themselves with."

Passmore says it is a complex task to set up an enterprise network to recognize what kind of application is coming through, and then to allocate a designated amount of bandwidth. That complexity had been multiplied because an administrator had to touch each router and

change the quality-of-service parameters. One misstep — a missed router or an incorrect setting — could make performance even worse.

For Longs, which has a router in each of its more than 400 stores, having to upgrade and reconfigure each router by hand would have been a huge job. But

Walker says he handled the entire setup in just a few hours from the company's Walnut Creek headquarters. He merely installed a new image of Cisco's IOS operating system, and updated with the NBAR feature, using remote management software.

That fear of complexity and of the rela-

tive ease of fouling up the network means that most network executives aren't managing their bandwidth.

They're simply pouring more bandwidth into the pot, hoping there will be enough to take care of all the company's needs — no matter what is being downloaded or sent out at any given time.

Cisco isn't the only choice in this market — Nortel, 3Com, Cabletron and Alcatel are also players. Even so, Passmore says few network administrators are using the bandwidth management software available.

Walker's network includes an IBM mainframe, about 800 Unix servers and 4,000 Windows NT 4.0 desktops. Walker connects the remote stores to the company's headquarters using a frame relay system with a hub-and-spoke typology. He has about 10 hubs set up with a typical speed to the stores of 128K bit/sec. He also is slowly migrating from Ethernet to Fast Ethernet, with most new workstations hooking up at 100M bits on a switch, as compared with the old 10M bits on a hub.

Despite the size of his network, Walker says he wasn't nervous about using the NBAR feature because he tried it in the lab before he ever touched the working network.

Walker says he set it up so that the router checks packets to determine the type of application, then refers to preset rules and policies to determine what level of priority that application will get. This is all done on the fly.

Walker uses six levels of bandwidth priority. Online transaction-processing applications receive top priority and are set up to run through in 2 to 7 seconds, according to Walker. E-mail receives a midlevel priority, garnering a fair amount of bandwidth. But e-mails, which tend to be the top cause of bottlenecks in most enterprise networks, also get capped.

"E-mails can be bandwidth hungry when they start coming through with big attachments," Walker says. "The system paces it and discards packets when it's over level. . . . It's not like we hang up on them. When they don't get an acknowledgement, they resend. The end user never knows what happens."

At the bottom of the priority barrel are late-night downloads for things like new source code and reference material.

Walker adds that, while he can't say how much NBAR has saved the firm, he can say using it has helped him successfully deploy a business application that is returning several million dollars per year.

"Without NBAR, we would have had to throw additional bandwidth at the problem and try to mask it. It would have been very expensive," Walker says. "And the real issue is that the new application is very efficient and my mission-critical legacy applications don't compete well against it for bandwidth. It was detrimental to those applications. . . . I set rules and limits, and that took care of it for me." ■

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# FIGURING FRAME COSTS

**Learn what factors go into frame relay pricing and how to finagle the best rates.**

BY KEVIN DUNETZ

**F**rame relay is popular for WANs because it's almost always less expensive to connect offices across the country with frame relay than it is with dedicated leased-line networks. Frame relay is usually the service of choice for companies that need to join at least three locations.

But just how much can you expect to pay? This second installment of a quarterly feature series about telecom communication pricing will explain the factors that affect the total cost of frame relay service and give you money-saving tips.

Think of a carrier's frame relay backbone as a cloud. You connect various sites into the cloud via ports, which can have speeds of 56K bit/sec to 45M bit/sec, depending on need. The carrier then links your ports via permanent virtual circuits (PVC). PVCs can have speeds of 4K bit/sec to 2M bit/sec, letting you control the amount of bandwidth you need between each office.

There are two ways to connect your office to a carrier's local frame relay port: user-to-network interface (UNI) and network-to-network interface (NNI). With UNI, your site is connected to the closest carrier point of presence (POP) via a 56K bit/sec modem or T-1 line. If you order a fractional port speed

such as 384K bit/sec, the carrier will usually make you buy a full T-1 line even though you don't need the whole circuit.

With NNI, your facilities are connected to a long-distance carrier via a port and PVC from the local exchange carrier.

The two architectures have different quality-of-service implications. When you subscribe to NNI, you're subject to the service levels of the local exchange carrier and the long-distance carrier. For example, you might have an excellent long-distance frame network, yet perceive inadequate performance levels due to an improperly managed local network. When you buy a direct point-to-point connection to the long-distance carrier for UNI access, you eliminate the local exchange carrier from the equation.

## Cost components

Long-distance frame relay network

## What it might cost you

Here is a sampling of charges for frame relay service with network-to-network interface.

Location	Port speed (K bit/sec)	Committed information rate (K bit/sec)	Monthly charges One-year contract	Three-year contract	Five-year contract
Washington, D.C.	1536	768	\$2,680	\$2,254	\$2,178
New York	1536	768	\$3,047	\$2,517	\$2,387
San Francisco	1536	768	\$2,901	\$2,505	\$2,458
Denver	1536	768	\$2,583	\$2,187	\$2,140
Atlanta	1526	768	\$2,886	\$2,419	\$2,312
Austin, Texas	1536	768	\$2,841	\$2,356	\$2,279
Chicago	1536	768	\$3,164	\$2,574	\$2,488
Washington D.C.	56	32	\$349	\$305	\$290
New York	56	32	\$315	\$272	\$252
San Francisco	56	32	\$311	\$283	\$279
Denver	56	32	\$248	\$220	\$216
Atlanta	56	32	\$332	\$275	\$241
Austin, Texas	56	32	\$329	\$275	\$245
Chicago	56	32	\$417	\$338	\$309

SOURCE: WINSTAR, NEW YORK

pricing can be broken down to two elements: Port charges and the PVC between each of the ports.

The port charges are calculated differently for NNI and UNI. For NNI, the price of each long-distance frame relay port is the sum of the local frame relay port plus the long-distance carrier's port.

For UNI, the rate includes the cost of a local loop from your site to the nearest long-distance carrier's POP, plus the long-distance carrier's port charge.

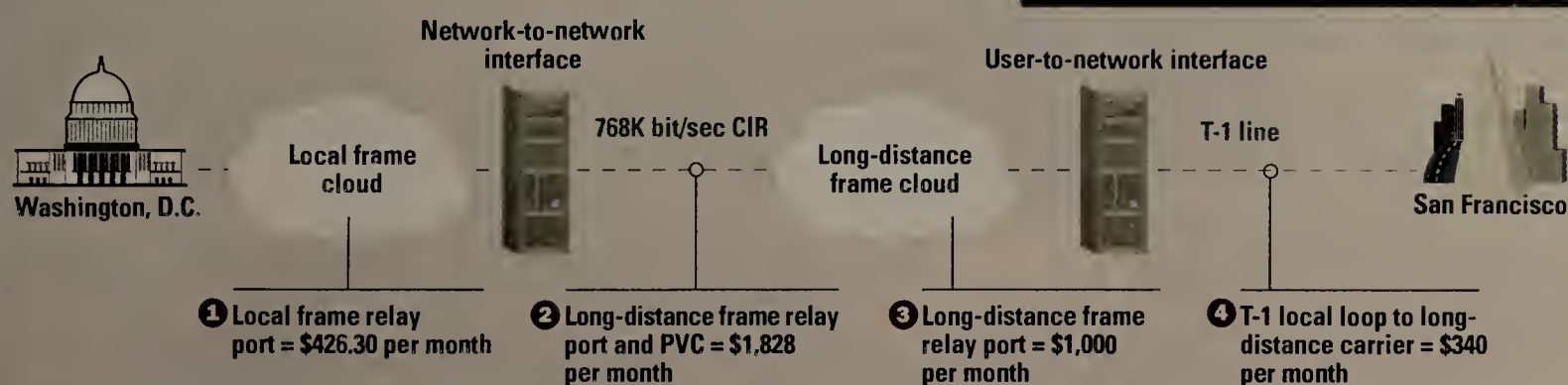
NNI pricing isn't distance-sensitive because local exchange carriers charge

a flat fee to connect to their frame cloud from anywhere in the calling area. However, UNI pricing tends to be distance-sensitive because you're paying for local-loop connections. Some carriers are trying to fix the price for the local loop; however, the fixed rate usually ends up being an average of various locations in the calling area. This means that some customers pay less than they normally would while other customers end up subsidizing the difference.

PVCs are usually simple to calculate. The price is generally based on the committed information rate (CIR), or the minimum amount of bandwidth guaranteed to be available. The faster the CIR, the more expensive the PVC.

The graphic on the left breaks down typical pricing elements for a frame relay network. In this example, a Washington, D.C., office is connected to a site in San Francisco for \$3,594.30 per month. NNI access in Washington costs \$2,254.30 per month, while UNI access in San Francisco amounts to

## Adding up frame relay costs





\$1,340 per month.

To get an idea of current NNI port and PVC charges, check the chart on page 69. These rates include the cost of the local exchange carrier's port and the long-distance carrier's port. Faster port and CIR speeds drive up the price, while signing on for a longer contract

gives you a break on the monthly rate. A coast-to-coast frame link from might cost the same as a connection between two cities 100 miles apart.

#### Where to buy

National frame relay networks are available through all the traditional

long-distance carriers. Most often, their services provide UNI access. Some newer players such as Qwest are beginning to build frame networks. In many cases these networks don't cover the entire country, so parts are outsourced to other carriers.

If you're looking for NNI access,

consider talking to Intermedia and WinStar. Both have a very large footprint of coverage, although WinStar is considered to have a stronger West Coast presence, whereas Intermedia is probably the dominant carrier in the East.

In terms of price, the traditional big three carriers tend to be the most expensive due to their extensive international backbones and ambitious service-level agreements (SLA). If you want to save money, you'll probably want to look at one of the newer carriers like Intermedia, Qwest and WinStar who are aggressively courting customers.

#### Savings strategies

To get the best price on frame relay networks, follow these guidelines:

- Get quotes from multiple carriers. Obviously, this rule applies to any competitive technology. Use your leverage to push the carriers down to their best numbers.

- Analyze your network architecture to determine the best layout. Frame relay networks can get expensive if you set your port speeds too high or add too much redundancy via meshing.

- Save money by hubbing locations in the local calling area before sending the data over the long-distance frame network. For example, if your headquarters is in one local area, and your eight remote sites are in another, it's cheaper to connect the eight sites into one local network and only buy one long-distance frame link between the regions.

However, price shouldn't be the only factor that goes into your purchasing decision. Frame isn't yet a commodity like T-1 lines, so read the fine print in SLAs. If you find a price that seems significantly low, keep in mind that you just might get what you pay for.

*Dunetz is vice president of engineering with Telco Exchange. The company's Web site at [www.telcoexchange.com](http://www.telcoexchange.com) offers an online marketplace for high-bandwidth communication services from major carriers and ISPs. Dunetz can be reached at [kevin@telcoexchange.com](mailto:kevin@telcoexchange.com).*

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**Moderator:** John Gallant

**Date:** Monday, September 25, 11:00am - 12:15pm

**Location:** See Conference Guide

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**IP** PBXs aren't just small-office playthings anymore. With near-universal agreement that telephony will be carried within IP packets, vendors are preparing their next-generation PBXs with capacities and features they hope will position their products as competitors to classic enterprise-level PBXs.

A Mier Communications survey conducted last month showed that some IP PBXs can reportedly scale to 10,000 stations, whereas a year ago the average system supported a maximum of 50 to 100 stations. Mier Communications also found that the market is segmented into low-, midrange and high-end systems.

Vendors of classical PBXs have also entered this crowded field by adding voice-over-IP gateway cards and modules to "IP-enable" their existing PBXs.

As far as features are concerned, all vendors are branching out from basic PBX features such as hold, wait and transfer, by adding more advanced PBX features like modem relay and fax support, interactive voice response, billing and accounting, direct-inward-dial, elaborate call routing, least-cost routing and toll restrictions.

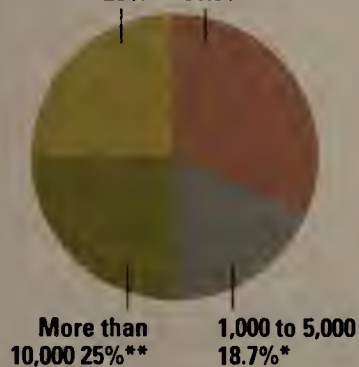
Miers detailed questionnaire went to 36 vendors that we believed were shipping or planning soon to ship IP PBX products. The systems go by a variety of names, including Telephony-over-IP exchange, Integrated Communications Server and IP Telephony Server.

We received 22 responses. However,

## Figure 1: Rising IP PBX Capacities

According to the 16 vendors we surveyed, the maximum number of stations supported by IP PBX products on the market is rising fast, from an average maximum of 50 to 100 a year ago to more than 10,000 today. "Stations" includes any connected end-device/node, including IP phones, analog phones, PCs, faxes, etc.

Up to 100 stations 25% 101 to 216 stations 31.3%



\* None of the IP-PBX products supported a max capacity between 217 and 999 stations.

\*\* None of the IP-PBX products supported a max capacity between 5,001 and 9,999 stations.

# IP PBXs scale for the enterprise

**With upstart vendors showing improved features and scalability, plus traditional PBX vendors joining the fray, rapid market growth for IP PBX gear is expected in the next year.**

BY BETSY YOCOM AND EDWIN MIER

not all were complete and some of the products didn't quite fit, so several were disqualified. The final participating vendor list was: 3Com, Alcatel, Cisco, Dialogic, Ericsson, Intecom, Inter-Tel, Avaya/Lucent, Mitel, NEC, Oki Network Technologies, Shoreline Communications, Tek Digitel, Vertical Networks, Vovida Networks and Vive Synergies.

## Expanding capacities

As recently as late last year, IP PBXs generally supported just 100 or fewer stations and were targeted mainly at small-office and branch-office applications. We define "stations" as any connected device, including phones, PCs, faxes and others. Today, however, only 25% of the products surveyed top out at 100 stations. Approximately 30% support maximum capacities in the 101-to-216-station range (see Figure 1), and nearly 20% support between 1,000 and 5,000 stations. Products in this midrange group include Lucent's Definity; Alcatel's OmniPCX 4400 and the Shoreline Communications System.

On the high end, there are systems that can support thousands of stations. For example, Cisco's AVVID can reportedly support up to 10,000 stations, and the company claims it is aiming at 100,000 users within the next five years. Cisco's AVVID targets the same high-end enterprise users as traditional PBX vendors such as NEC and Intecom do with their IP-enabled PBXs, but AVVID is based on an entirely different architecture. Cisco advocates replacing the traditional fixed-bandwidth, time-division multiplexed PBX switch fabric with a distributed IP network.

Mier Communications has not yet

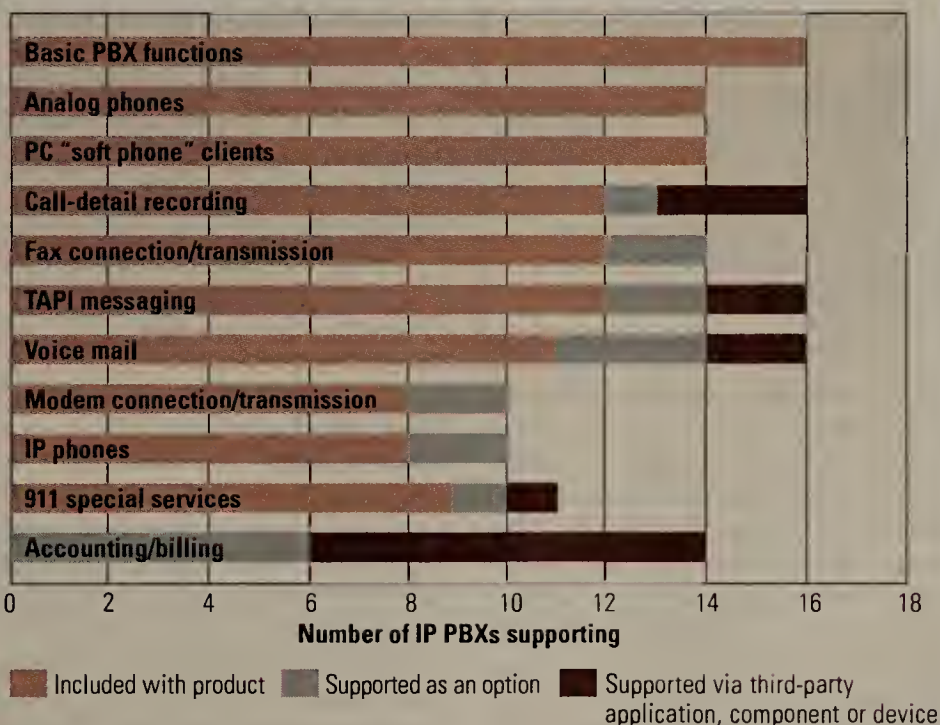
vendors dominated the IP PBX market. Early entrants included Cisco, which had acquired Selsius; 3Com, which had acquired NBX; Shoreline; and Vertical Networks. Most of the traditional PBX vendors such as Intecom, Mitel, NEC and Lucent were conspicuously absent.

That changed in June 1999, when Lucent introduced voice-over-IP and IP add-on components for its popular Definity PBX line. Today, most of the well-established PBX vendors, including Ericsson, Intecom, NEC and Mitel, are offering pathways so that their large installed bases can migrate to IP.

Even though their IP-enabled products are based on older technology, which has to be retrofitted for IP convergence, classic PBX vendors have some advantages over the newer server-based integrated communications platforms. Their products are widely installed, and they have established track records for products and customer service. They also offer hundreds of PBX features that their newer, IP-PBX cousins don't yet support. These include "do not disturb" functions, feature keys, paging

## Figure 2: Feature rich IP PBX systems

Our survey showed that most vendors are augmenting basic PBX call features including call hold, call transfer, call waiting, call forwarding and conference calling, to offer enterprise customers a richer, expanded feature set.



tested many of the new high-end IP PBXs or IP-enabled PBXs, and cannot substantiate the capacity claims. It is clear from its research that the capacities reported by IP-enabled PBX vendors represent the maximum combination of voice-over-IP calls along with regular public switched telephone network connections. So the high capacities claimed for many of the IP-enabled PBXs are not just for voice-over-IP calls.

## The new, old players

As recently as a year ago, a handful of

and off-hook voice announcement.

The next-generation IP PBX vendors counter this feature argument by saying that most of the hundreds of features supported on classic PBXs are seldom used. A typical company probably uses fewer than 10, according to Mier Communications research. Nonetheless, enterprise users are loath to give up anything to migrate to IP.

## Key features

In terms of basic PBX features, IP PBXs are on par with their IP-enabled



counterparts. The IP PBXs we surveyed support call hold, call waiting, conferencing, call transfer and call forwarding (see Figure 2).

Many of the IP PBX products also support more advanced features. Voice mail is widely available, usually as an integral feature. Voice mail ships as standard with 3Com's NBX 100, Dialogic's IPLink, Ericsson's WS2000, Inter-Tel's AXXESS IP PBX, Avaya/Lucent's Definity and IPExchangeComm, Mitel's Ipera

In some cases, such as with Alcatel's OmniPCX 4400, Cisco's AVVID, Ericsson's WS2000 and Avaya/Lucent's Definity, PC support comes in the form of a software-based attendant console or other specialized application, such as a call center for bulk call handling and distribution.

Support for IP phones, which are now available with roughly two-thirds of the IP PBX systems, is growing. Half of the products now support an IP phone, and a couple of vendors, such as Shoreline, support an IP phone from a third-party source. IP phones are usually powered via a plug-in AC/DC module for each phone, but several vendors are planning to support in-line power once standards are ratified.

### Call-control platforms

Among the "new" IP PBX vendors, Windows NT is the most widely supported platform for call-control and call-routing functions, while established PBX vendors tend to rely on Unix or an embedded operating system (see Figure 3). Many of the IP PBXs Mier Communications has tested over the past year were based on NT, and these proved stable and reliable in most instances — even withstanding heavy call loads for long periods of time. Therefore, it appears that some of the initial reservations expressed about putting critical communications functions on an NT platform are subsiding.

Despite the popularity of NT, today's IP PBXs often support more than one platform, and it is not unusual to find an IP-PBX vendor offer its call-control on NT or Unix. We found only two IP PBXs — from Cisco and Dialogic — that support Windows 2000 for call-control and call-routing functions.

### Voice-over-IP standards: A moving target

We found that Version 2 of the ITU-T's H.323 standard is the most widely supported voice-over-IP standard today, with 88% of the products supporting it (see Figure 4). However, H.323 does not appear to be the long-term direction of the IP-PBX vendor community. Only 13% of the products currently claim support for H.323 Version 3. This version was ratified in February but is not widely adopted because it's not backward-compatible with previous versions, is complex and difficult to implement. Only about one-fourth of the vendors we interviewed plan to adopt H.323 Version 3 within the near future.

Our survey shows there are too many incompatible voice-over-IP standards. Vendors agree that H.323 is too complex to implement, and many — including those that now support H.323 — are looking to other stan-

dards, such as Media Gateway Control Protocol (MGCP) and H.248, also known as Media Gateway Control (MEGACO), as the basis for their products' future interoperability.

MGCP and H.248/MEGACO are currently implemented by 31% and 19% of the products, respectively. However, we expect to see more widespread adoption of both of these standards within the next year. Almost half of the vendors we interviewed plan to add MGCP support, and more than one-third said they will add support for H.248/MEGACO in the next year.

MGCP and H.248/MEGACO notwithstanding, the big trend is clearly toward Session Initiation Protocol (SIP), which was published as an Internet draft document last year. While only 13% of the products we surveyed support SIP now, more than two-thirds of the vendors said they will implement SIP over the next year.

Given the turmoil in the voice-over-IP standards arena, it isn't surprising that there is little interoperability among vendors' IP PBX equipment. Even so, several of the vendors we spoke to indicate that interoperability is a big user concern, and some positive movement toward interoperability is slowly happening.

3Com's NBX 100, an early IP PBX market leader, interoperates with a number of other vendors' products, including Elemedia/Lucent's H.323 gateways; Apropos' Total Interaction Management Call Center and Symbol

IP phones.

According to Hank Lambert, Cisco's manager of IP telephony infrastructure, Cisco supports all the voice-over-IP standards mentioned so far, providing bridges among all the different installed bases. Cisco says it also interoperates with Symbol Wireless Phones and Microsoft NetMeeting.

### Management and monitoring

A majority of the IP PBXs surveyed support a Web browser-based management interface, often in addition to a Windows-based application. SNMP is supported on 75% of the products, but in some cases this is limited to general system monitoring.

More than half of the vendors said they supported a mix of real-time status monitoring of analog/digital trunks; IP bandwidth utilization; number of calls in progress; relative quality of IP network transport; and voice-mail storage capacity.

How the vendors handle event logging and reporting — the key components of fault management — varied.

On the NBX 100, 3Com maintains two logs: One captures a record of administrative changes; the other captures warnings and errors. Both can be viewed via a Web-based interface.

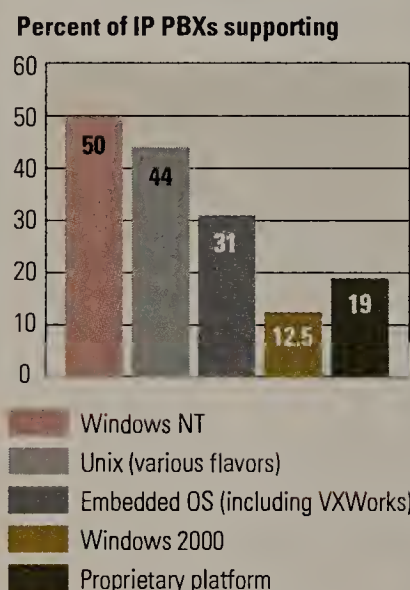
Ericsson's WS2000 Version 2.5 supports event reporting on hardware and software failures, as well as any subsystem event.

On Avaya/Lucent's Definity, monitoring is SNMP-based, including fault

See **Review**, page 76

### Figure 3: IP PBX Call-Control/Call-Routing platforms of choice

Our survey showed that Windows NT is the operating system of choice for handling IP PBX call routing functions, followed by Unix as a close second.



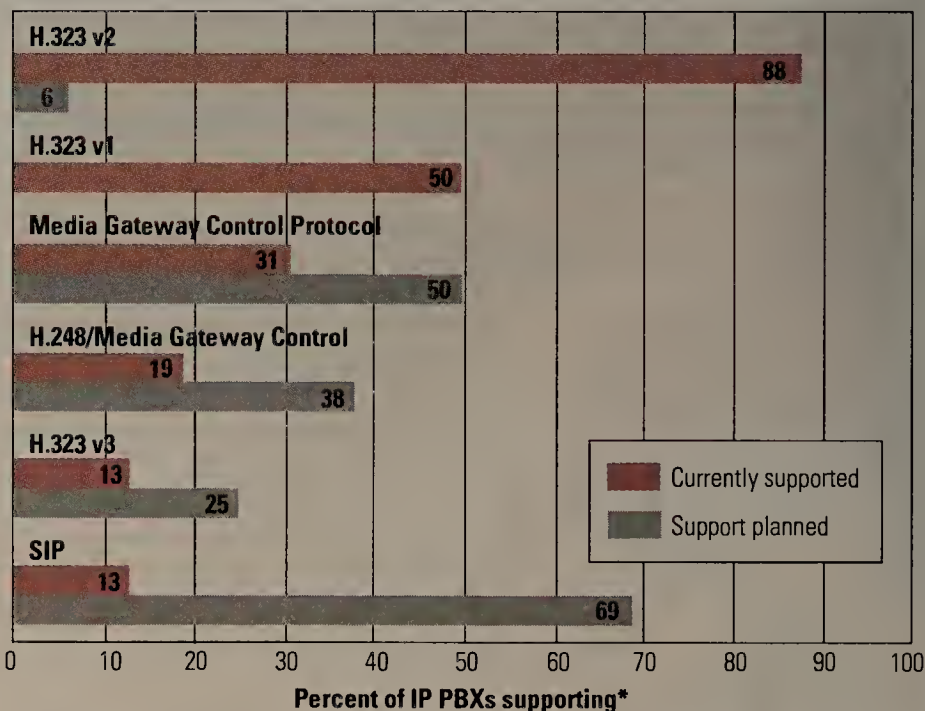
2000, Shoreline's Communication System (Version 2.0).

With Alcatel's OmniPCX 4400, Cisco's AVVID, NEC's NEAX 2400, Oki Network's IPstage and Vertical Networks' InstantOffice, voice mail is supported either optionally or via a third-party add-on or application. Call detail recording, fax, Telephony API messaging and modem support are widely supported. Accounting and billing features are also available, but typically as an option from the IP PBX vendor or via third-party application.

With few exceptions, PC clients are widely supported. These are usually in the form of soft phone software, in which callers use their desktop PCs with microphone/headphone, running a special application, as a regular phone. On Avaya/Lucent's IPExchangeComm, Oki Network's IPstage and TEK Digitel's V-Server OfficeBuilder, client support is limited to support for Microsoft's NetMeeting, one of the most widely used conferencing applications.

### Figure 4: VoIP standards supported by IP PBX systems

While the reigning voice-over-IP standard H.323 Version 2 is supported by most IP PBX vendors today, that complex set of protocols is likely to be replaced by Session Initiation Protocol (SIP) as the IP PBX interoperability standard of choice in the future, according to our survey.



\*Based on 16 systems detailed by vendors in response to our survey. Percents total more than 100 because a few vendors claim their systems can be configured to support different voice-over-IP call-control standards.



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Review,  
Continued from page 74

and traffic analysis, long-term reporting of alarms, trunks, stations, configuration and inventory.

Vertical Networks' InstantOffice supports a "trace manager" — a complete system activity log that reports calls in progress in real time; abnormal events are flagged and traps and alarms are issued accordingly. InstantOffice also supports an independent fault monitor.

Shoreline integrates its event logging, alerting and warnings into the NT event log, viewable via a Web browser and with customizable event filters. Severe alerts can trigger an e-mail to a specific technical-support employee.

## Pricing trends

Average prices for IP PBXs are about \$50,000 for a 100-station system — or about \$500 per port — in configurations supporting IP and/or analog station ports, one T-1 trunk or 24 analog trunks, voice-over-IP support and management. Vertical Networks' InstantOffice was the least-expensive product in our survey ringing in at \$331 per station. Alcatel's OmniPCX 4400 weighs in on the high

end — nearly \$1,000 per station — depending on the type of handsets and features supported for 100 station ports. The high-end price includes voice mail.

Vendors with low-end IP PBXs, supporting fewer than 50 stations, are developing relationships with service providers to penetrate new markets.

Tek Digital's V-Server OfficeBuilder, which costs \$1,699, is being sold primarily to service providers that bundle the product into their service offerings. The service providers make their money on the monthly service charges — not through the sale of OfficeBuilder.

## Market directions

IP PBX vendors are understandably upbeat about the future. Most see the installed base at least doubling within the next three to four months. Others predict that more than 10% of all PBX ports installed within the next three years will be IP ports.

"The market is not just experimental anymore. It's becoming practical," says Bo Larsson, senior vice president of Ericsson's Enterprise systems. Larsson says telecommuting, particularly in high-end campus environments, is driving sales of Ericsson's WS2000 (formerly the WebSwitch).

Vendors say they're selling into existing accounts and into so-called "greenfield" environments, in which new buildings are being wired for telephony.

According to vendors, users are not installing IP PBXs or any other voice-over-IP equipment because it's the most cost-effective path — initial outlays can be quite high. When we asked vendors to rank five reasons why their customers are installing IP PBXs, "because it's the most cost-effective solution" finished last. The main reason for deployment was to gain leverage for new technologies.

Vendors say their customers are buying IP PBXs because they need an infrastructure to support an IP/voice network.

Mitel's Moss says in the first year of implementing an IP/convergence infrastructure, a customer will have to make a significant capital investment but will start to gain that money back in subsequent years. Other vendors said the "learning curve" and training issues associated with the move to new technologies are driving these increased costs.

It's clear that the technologies to enable data and voice convergence are available now and will be even more widely installed during the next few years. We believe IP PBXs have finally arrived. Early

entrants into this market, such as 3Com and Vertical Networks, gained substantial market shares, while traditional PBX vendors sat on the sidelines deciding whether this voice-over-IP technology would seriously impact their installed bases.

If the expansions we're observing are any indication, the IP PBX market is about to heat up considerably.

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Mier Communications, a member of the Network World Global Test Alliance, also conducts comparative lab testing of IP PBX and other voice-over-IP products. For more Test Alliance information, including what it takes to become a member, go to [www.nwfusion.com/alliance](http://www.nwfusion.com/alliance).

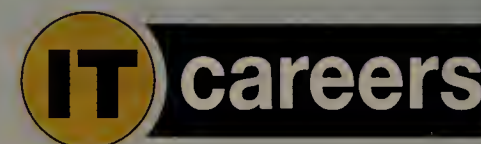


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**H**ewlett-Packard's NetServer LT6000r enterprise server is full of surprises. It's a six-way machine fitted into a four-way box that packs quite a performance punch. We were impressed with the design and the ease of use of this server.

The unit we tested, which appeared at first to be another four-way, four-rack space server, came with six Pentium III processors and 1G byte of RAM that can be upgraded to 8G bytes. The server's multiprocessor architecture is built on the standard ServerWorks' ServerSet III HE chipset as opposed to Intel's Profusion architecture, which can support up to eight processors. The ServerWorks chipset normally supports four processors, but HP has altered the processor bus layout to fit in six CPUs. HP claims the ServerWorks chipset performs incrementally better than the Intel chipset due to that lack of coherency filters found in the ServerWorks chipset.

This is the first enterprise server we have tested with our new file, network and database tests (see How We Did It, page 80). Until we test other servers against this new methodology, we have no point of reference. However, in general, the HP NetServer LT6000r server performs very well.

The file results are in line with what we would expect for this class of server. By that, we mean the file test results for this box rang in at three to four times that of the same tests run on a server with two processors (see graphic, page 80).

The processors in this box were not running at 100% utilization during any of the file tests. This implies that there is a bottleneck elsewhere in the server system. Most likely, the bottleneck lies in the bandwidth of the individual drives. The drives were configured in a RAID-0 stripe set using the RAID controller, but the server was shipped with only five drives in the RAID-0 stripe sets. A server with six processors would require more on the order of 20 drives to reveal the full performance of the RAID controller. Therefore, we believe this bottleneck could be alleviated by reconfiguring the RAID set or by adding more drives.

The network tests showed the HP NetServer LT6000r can handle a large number of transactions per second. We saw this server process in excess of 10,000 transactions per second. This heavy load creates stress on the I/O subsystem including the network interface. The CPUs were not pegged during this test, which leads us to believe that the bottleneck is the I/O subsystem as is expected in most servers. In the CPU database tests, the Oracle and SQL Server 7.0 numbers

# HP's NetServer LT6000r pushes the server envelope

**Lots of power in a small package.**

BY JOHN BASS, NETWORK WORLD TEST ALLIANCE

## HP NetServer LT6000r feature and configuration table

Vendor	Hewlett-Packard
Price (as tested)	HP NetServer LT6000r — \$32,624; HP NetServer RS/12 drive enclosure — \$5,483
Processor type	Pentium III Xeon 550-MHz 1M byte cache
Number of processors	6
Number of processors supported	6
Memory configuration	1GM 100-MHz ECC SDRAM
Number and type of RAM slots	8 PC133 slots
Expansion slots present	2 66-MHz 64 bit; 4 33-MHz 64-bit hot plug.
Expansion slots available	3
Disk controller	HP NetRAID Controller with two SCSI2 channels.
HD description	9.1G-byte Ultra2 10K rpm Seagate Cheetah.
Number and description of HD bays	4 internal; 12 external.
Network interface	1 built in HP Fast Ethernet NIC; 3 HP PCI Fast Ethernet NICs.
CD-ROM	EIDE CD-ROM
Availability features	ECC memory; hot-swappable 4+2 redundant fans; hot-plug drives; Hot-plug PCI ready; load balancing, 2+1 redundant, hot-swappable power supplies.
Manageability features	HP TopTools for Servers; HP OpenView ManageX; HP Remote Assistant.
Security features	Start-up password; serial port and floppy disable; chassis intrusion detection.
Bundled software	HP Navigator Installation Aid
Warranty	Three-year next business day onsite; prefailure warranty on hard drives and RAM; phone support for the life of the server.

## HP NetServer LT6000r Scorecard results

	Performance 40%	Features and flexibility 30%	Manageability 20%	Serviceability 10%	Total score
HP LT6000r	9	9	8	8	8.70

Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score. Scoring key: 10 — Can't be better; 9-8 — Excellent; 7 — Very good; 6-5 — Average; 4-2 — Needs improvement; 1 — Not supported or doesn't work

cannot be compared to each other directly because of the different database configurations. Also, the SQL statements were slightly different between Oracle and Microsoft's SQL.

The HP LT6000r also performed extremely well in our new CPU database test. Running SQL Server on Windows NT 4.0 and Windows 2000, the HP NetServer LT6000r server got a marginally better score than the Dell 8450 loaded with six CPUs we tested earlier this year. With 30 virtual users, the HP NetServer LT6000 achieved 1.83 and 1.81 transactions per second with NT and Win 2000, respectively. The Dell server we tested earlier this summer running with six CPUs achieved 1.68 and 1.71 transactions per second with NT and Win 2000, respectively. However, this increased performance for the HP NetServer LT6000r is to be expected because its architecture does not incur the overhead of the coherency filters found in the Profusion chipset used in the Dell 8450.

The features and flexibility of this server are excellent, earning the HP NetServer LT6000r a 9.0. Six processors in a four-unit high server space that includes hot-pluggable PCI slots, adds up to a feature-packed server that can grow with your network demands over time.

The manageability of this server is also very good. The server comes with an HP Navigator CD that provides drivers, management software and an installation aid for operating systems including NT, Win 2000, Novell NetWare, Linux and SCO Unix. The management software allows monitoring and configuration of the server through HP's TopTools for Servers. The monitoring and instrumentation drivers can also interface with HP OpenView as well as the other popular systems management platforms.

The operating system install aid that ships with the server was a breeze to use for the operating systems we tested it with, because it automatically made sure we had the proper device drivers installed. We appreciated the ease of operating system installation during our testing with three operating systems.

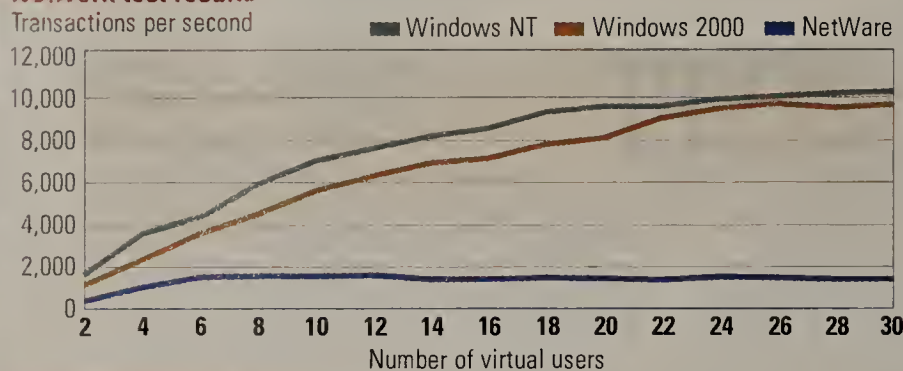
The components of the HP NetServer LT6000r are easily accessible. The tool-less and modular design make working on the server during a crisis easy to handle. The PCI cards are difficult to access, but with hot-pluggable PCI slots, you can minimize downtime while swapping PCI cards.

The front of the unit has an LCD display and slots for four hot-swappable, one-inch drives. The front bezel is hinged on the left side. When the bezel is opened, the hot-swappable drives and three hot-swappable

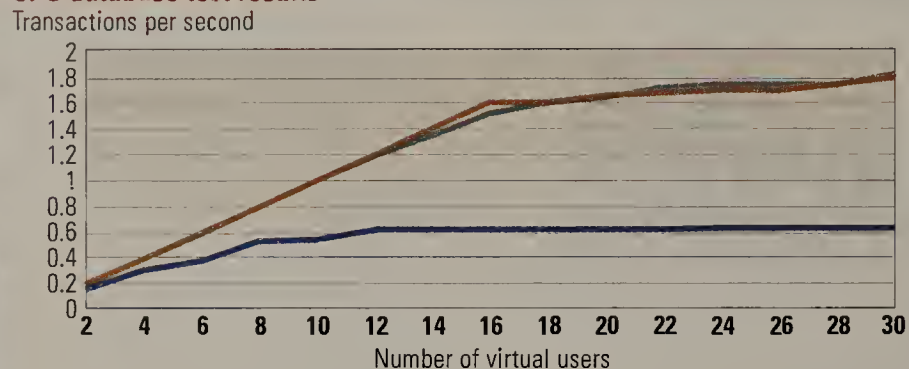


## The HP LT6000r performance numbers

### Network test results

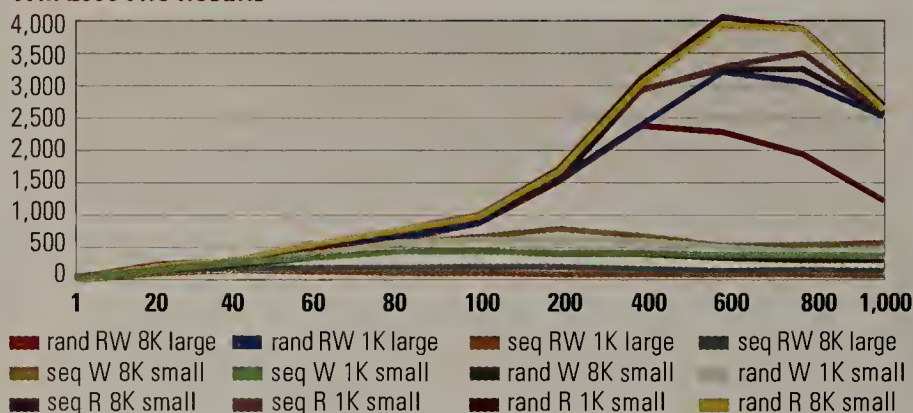


### CPU database test results



This graph shows the results of each of the 12 file server performance tests for Win 2000. The x axis is the number of virtual users. The y axis is transactions per second. For NT and NetWare file results go to [www.nwfusion.com](http://www.nwfusion.com), DocFinder: 9923.

### Win 2000 File Results



power supply modules can be accessed. The power supply units are in a 2+1 redundant, load-balancing configuration. Under the bezel, two latches retain the server into a rack. When the latches are disengaged, the server can slide forward on rack-mountable slides.

When the server is fully extended on its rack-mountable slides, a large latch handle is accessible from the top that is used to disengage the motherboard from the unit. With this latch disengaged, the top can swing open, exposing the processors and RAM. Another door on the top of the unit allows access to hot-swap redundant fans. A door on the left side of the unit allows access to six 64-bit PCI slots. This completely tool-less entry design made getting to all the components of the server easy. However, due to the layout of the server, a few PCI slots were a little difficult to access.

The server we tested was attached to a 12-drive enclosure that contained seven drives. The server also came to us with a dual channel Ultra2 SCSI RAID controller. The internal drives and external drive enclosure are connected to the RAID controller, which came configured with three logical drives in a RAID-0 configuration.

One logical drive maps to the first drive in the internal drive bay. The second logical drive maps to the remaining three drives in the internal drive bay and the first two drives in the external drive enclosure. The third drive enclosure maps to the remaining five drives in the external drive enclosure. The first logical drive is 9G bytes and is used for the operating

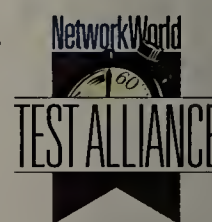
system. The other two logical drives were 45G bytes and were used for data partitions.

The HP NetServer LT6000r has a space saving Enhanced Integration Drive Electronics (EIDE) CDROM similar to those found in laptops. It comes with four Fast Ethernet connections, one port built in to the server and the remaining three in PCI slots.

With the combination of power, size, and serviceability, the HP NetServer LT6000r is a great enterprise server package for limited disk space high-rack density CPU intensive installations. With the addition of an external disk enclosure, the HP NetServer LT6000r can also operate well as a large file server.

*Bass, a senior technical staff member at CNL and co-author of McGraw Hill's Building Cisco Multilayer Switched Networks, designs and leads the execution of the test suites. He can be reached at [john\\_bass@nscu.edu](mailto:john_bass@nscu.edu).*

*Bass is also a member of the Network World Global Test Alliance, a cooperative of the premier reviewers in the network industry, each bringing to bear years of practical experience on every review. For more Test Alliance information, including what it takes to become a member, go to [www.nwfusion.com/alliance](http://www.nwfusion.com/alliance).*



## How We Did It

Our testbed comprised 15 clients with a minimum configuration of two 400 MHz Pentium II processors with 128M bytes of RAM. Each client has one 100M bit/sec Ethernet network interface card for connection to the Fast Ethernet test network.

We used Benchmark Factory test software to coordinate the test development, client load, result gathering and archiving for all the tests. We ran a series of file, network and database tests against Windows NT 4.0, Windows 2000 and Novell NetWare 5.1.

Using Benchmark Factory software, we defined several tests to look at the performance of the file subsystem. We broke our benchmarking tests into two categories — small file and large file transfers.

For the small file transfer tests, we used a three-dimensional test matrix of transfer direction (read/write), block size (1K byte/8K byte), and transaction type (random/sequential). This test matrix resulted in eight tests. We separated all combinations into individual tests to see how each server would react in each situation. The small file transfer

tests use a file size mix of 80% 1K-byte file, 10% 10K-byte files and 10% 50K-byte files.

For the large file transfer tests, we combined the reads and writes together in the same tests. We then created a set of tests that covered all combinations of the transfer type (random/sequential), and block size (1K byte/8K byte). This resulted in four tests. The reads and writes were combined because this emulates large file service behavior for services such as FTP and home space services. The reads and writes were distributed as 90% reads and 10% writes. For each of the large file transfer tests, the file size distribution was 80% 500K-byte files and 20% 1M byte files. Ninety percent of each of the file sizes are reads and 10% are writes.

Each of the files needed for each virtual user was created at the beginning of each test. Each test ran five iterations of increasing load. The number of virtual users started on each client controlled the load. The number of virtual users for each step was found by running each of the tests against each network operating system to find where the knee of the performance curve lay. From there, we determined a standard set of load

parameters to run the tests.

The CPU database test used Microsoft SQL Server 7.0 with both NT and Win 2000. We increased the number of virtual users from two to 30. The number of virtual users in no way implies a limitation the database server. Each virtual user in our test is atypical of a "real world" user in that the load generated by these virtual users is much larger. Each virtual user calls a computationally heavy stored procedure residing on the database server thus reducing the number of network transactions per unit time to concentrate the load on the processors. The virtual users then waited 9 seconds before executing the Stored Procedure again.

We used another database test employing a much less intensive transaction to test the network I/O performance of the server. This was achieved by generating a large amount of transactions against the server.

Like the CPU database test, the number of virtual users is increased from two to 30 to obtain a characteristic performance curve.

To test this server's performance in a NetWare environment, we ran similar CPU and network test against an Oracle database running on NetWare 5.1.



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**K**nowledge is power for IT professionals, and this fall's NetWorld+Interop 2000

Atlanta show promises to deliver a substantial jolt of network education and information.

The show, taking place at the Georgia World Congress Center from Sept. 24-29, will feature products from more than 500 vendors and educational programs covering today's alphabet soup of hot IT topics, such as VPNs, ASPs, quality of service and voice over IP.

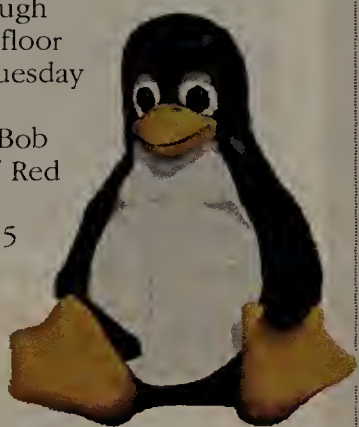
The following is our guide to the best sessions, keynotes and workshops throughout the week:

## Picks of the Week

### Linux Business Expo

**Monday, Sept. 25 to Thursday, Sept. 28**

Linux has been touted as a breakthrough operating system, with its low cost and high reliability. The Linux Business Expo's four days of conference sessions, workshops and product expositions will help you decide if Linux is right for your network. The Expo includes sessions and workshops from Monday through Wednesday and a floor exposition from Tuesday through Thursday. Keynotes include Bob Young, founder of Red Hat Software, on Tuesday from 10:15 a.m. to 11:15 a.m. and Nicholas Petreley, Linux Evangelist for Caldera Systems, on Wednesday from 10:15 a.m. to 11:15 a.m. The Linux Business Expo was put together by several leading Linux industry figures, including Larry Augustin, president and CEO of VA Linux Systems; John "Maddog" Hall, executive director of Linux International; and Linus Torvalds, creator of the Linux operating system.



### ASP Summit

**Wednesday, Sept. 27 to Thursday, Sept. 28.**

This two-day event is for application

service providers (ASP) and users who are interested in outsourcing their applications. The ASP Summit will feature seminars on how to set up an ASP business, and will include testimonials from ASP customers on their software outsourcing experiences. While geared toward ASPs and outsourcing businesses, the summit can provide valuable information for enterprise users on how ASPs do business and what kind of services ASPs can deliver. The ASP Summit faculty includes Eugene Lee, vice president of marketing for Cisco; John Marchese, director of business development for Citrix; and Mitch Kristofferson, marketing director for Corio.

## Highlights

### Monday, Sept. 25

**8:30 a.m. to 4:30 p.m., Monday and Tuesday.**

### HOT TOPICS IN NETWORKING: ATM, IP SWITCHING, 10 GIGABIT ETHERNET, QOS, VOIP, VPN AND WDM

Networks have changed dramatically over the last few years. This two-day tutorial will bring you up to speed on all the recent advancements made in LAN and WAN switching technologies, as well as trends to expect down the road. Raj Jain of Nayna Networks leads this comprehensive tutorial.

### 9 a.m. to 6 p.m.

### VPN DAY

Network professionals who want a crash course in VPN technology should check out this one-day event. VPN Day will consist of sessions that cover everything from the VPN basics to advanced topics such as QoS and cryptography, and security technologies such as public-key infrastructure and IP Security. Case study and information sessions will be complemented by technology demonstrations of the latest VPN gear and technologies. VPN Day is free to general conference attendees, and costs \$595 for others. Speakers include Frederick Avolio, Avolio Consulting; and Joel Snyder, senior partner, Opus One.

### 11 a.m. to 12:15 p.m.

### BEST PRACTICES IN SUPPORTING E-BUSINESS INITIATIVES

IT executives from leading e-business companies will discuss how they established links with the business side of their organizations to be successful at e-commerce. Panelists will discuss the hits and misses they experienced in setting up shop on the Internet, and what their plans are for the next year. Moderators and speakers include Peter Brown, vice president, PricewaterhouseCoopers; John Gallant, editorial director/senior vice president, *Network World*; and Sandra Gittlen, managing editor, Network World Fusion. This session is part of the Strategic Interop program focusing on e-business, which runs Monday and Tuesday and costs \$995.



## Highlights cont'd.

1:30 p.m. to 2:30 p.m.

### USING ASPs TO ENABLE E-BUSINESS

Representatives from several service providers will discuss and answer questions on how service providers can help companies implement e-business technology faster. Topics will include what you should and should not outsource and why, as well as typical time-to-market outlines for various ASP services. Panelists include Krik Krappe, senior vice president, Corio; and Peter Kirwan, chief technology officer, NaviSite. This session is part of the Strategic Interop program.

Tuesday, Sept. 26

12:30 p.m. to 1:30 p.m.

### Keynote address:

**John Miner, vice president and general manager, communications products group, Intel.**

If you're an e-business IT professional, don't miss Miner's presentation, "Enhancing eBusiness Services." Miner will discuss how to implement business-to-business e-commerce relationships with suppliers and customers, and what the future of e-business will look like.

8:30 a.m. to 4:30 p.m.

### TROUBLESHOOTING TCP/IP: ANALYZING THE PROTOCOLS OF THE INTERNET

This workshop will show you what problems can arise when using TCP/IP, as well as related protocols such as ICMP, ARP, OSPF and application protocols such as FTP and HTTP. This workshop provides a detailed overview of the TCP/IP suite and how to analyze and fix Internet-related problems in your network. Mark Miller of DigiNet Corp. leads the workshop.

10:15 a.m. to 11:15 a.m.

### QUALITY OF SERVICE FOR THE ENTERPRISE

Traffic on enterprise networks today is more diverse than ever, with new applications demanding more priority and bandwidth than others. This session will cover how QoS is being used more to support emerging enterprise applications such as IP voice and video and other network services. Eric Siegel, Internet consultant for Keynote Systems, will lead the discussion.

11:15 a.m. to noon.

### WAN E-PLUMBING

Dropped packets, traffic delays and security issues are problems that go with being a Web-based business. This session will cover how companies can use technologies such as caching, WAN redirection, autonomous system routing and network overlays to work around the shortcomings inherent in the Internet. Hooman Beheshti, chief technology officer of Radware, will lead the discussion.

11:30 a.m. to 12:30 p.m.

### 10-GIGABIT ETHERNET AND ITS IMPACT

10-Gigabit Ethernet is changing how carriers deliver services in metropolitan-area networks and is infiltrating enterprise networks as a new high-speed backbone technology. Learn about this important step up in high-speed Ethernet technology and what it will mean for enterprise networks. Bruce Tolley, product manager, enterprise business line at Cisco, leads the discussion.

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4:30 p.m. to 5:30 p.m.

## WAP APPLICATIONS

Learn how the Wireless Application Protocol is being used to improve the usefulness of communications software on cell phones, PDAs and other wireless handheld devices. Robert Berger, president of Internet Bandwidth Development; and Sam Adler, global alliances manager for Phone.com, discuss the development of this wireless protocol.

Wednesday, Sept. 27

9 a.m. to 10 a.m.



### Keynote address:

**Eric Schmidt, chairman and CEO, Novell**

Networks have evolved from a simple group of interconnected computers to a core business asset. Schmidt's presentation "It's one Net" will

discuss how the function of a corporate network changed from a communications and productivity tool to a central strategic platform for large corporations.

8:30 a.m. to 4:30 p.m.

## NETWORK ANALYSIS ESSENTIALS/SWITCHED NETWORK ANALYSIS AND VLANS

Part one of this workshop will go over basic network analysis concepts and how they are applied to a working enterprise network environment. The second part will deal with analyzing virtual LANs, and how to implement and troubleshoot this network-switching technology. The workshop will be conducted by Mike Pennacchi of Pine Mountain Group.

8:30 a.m. to 6 p.m.

## VOICE-OVER-IP DAY

Hype about voice/data network integration is inescapable. For managers of enterprise or carrier data networks who want to learn the technical ins and outs of voice-over-IP technology, this day of seminars is essential. Sessions will include how to integrate voice-over-IP into legacy phone networks, QoS for packetized voice, the various voice-over-IP protocols in use today, and voice-over-IP issues specific to enterprise and carrier networks. VoIP Day is open to general conference attendees for free and costs \$595 for others. The program will be led by Doug Moeller, vice president of advanced technology, Advanced Telecom Group.

11:30 a.m. to 12:30 p.m.

## WHY YOU SHOULD CONTINUE TO WORRY ABOUT VIRUSES

If you were hit by the Melissa or ILOVEYOU viruses, you know the harm these destructive programs can cause. This session will deal with how today's viruses are attacking networks and ways to prevent network infection. Carey Nachenberg, chief researcher, Symantec, will lead the seminar.

2 p.m. to 3 p.m.

## STORAGE MANAGEMENT ISSUES

Managing a storage-area network can be a whole different ballgame from enterprise LAN management. This session deals with issues SAN managers face, from interoperability between storage products and protocols, to data security and accessibility. Bill North, director of storage network programs for Veritas, leads the discussion, joined by Ruay Atac, director of marketing for Storage Networks, Doug Swords, storage solutions product manager, BMC Software, and Dennis Connor, director of storage programs, Hewlett-Packard.

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## Highlights cont'd.

3:15 p.m. to 4:15 p.m.

### VPNS AND BROADBAND LOCAL ACCESS SERVICES

DSL, cable modems and VPNs have forever changed how people telecommute, and how branch offices are connected to corporate headquarters. Learn how the latest broadband and VPN technology is being used to extend the enterprise LAN. Claudia Bacco, vice president of consulting for TeleChoice, is the moderator, with James South, chief technology officer, AdEvia, and Joel Snyder, senior partner, Opus One, leading the discussion.

Thursday, Sept. 28

8:30 a.m. to 4:30 p.m.

### INTEGRATING APACHE

This workshop will show you how to maximize the use of Apache Web server, the popular open source Web server that runs a majority of the world's Web sites. Workshop attendees will learn how to optimize applications for Apache as well as discover new ways to extend the Web server's capabilities. Andy Barclay of Corio leads the workshop.

8:30 a.m. to 4:30 p.m.

### IPV6: THE NEW VERSION OF THE INTERNET PROTOCOL

The latest version of the Internet Protocol — IPv6 — is in the early stages of deployment and standardization, which means big changes are on the horizon for network managers. This workshop explains the improvements of the new IP, such as stronger security and better support for multimedia, and how IPv6 will affect your network. Steve Deering of Cisco heads the workshop.

9 a.m. to 10 a.m.

### OPTICAL NETWORK ARCHITECTURE FUNDAMENTALS

Optical network technology is sweeping carrier networks and affecting corporate networks at the edge, and even inside the enterprise. This session will explain the basics of optical network technology and how it will be used in the future. Rowland Van der Meer, general partner at ComVentures, moderates the session, with Frank Robles, vice president of Yipes Communications, and Kevin Oye, vice president, Sycamore Networks.

11:30 a.m. to 12:30 p.m.

### MANAGEMENT POLICIES: FINDING THE END-TO-END SOLUTION

Policy-based network management tools have given network managers the ability to tweak and fine-tune network access and performance levels like never before. Find out where network management policies can be useful or problematic, and how to optimize your management policies for every part of your network. Mark Gaudet of Nortel Networks is the featured speaker, along with Chris Connor, senior product manager for policy services at Lucent.

2:45 p.m. to 3:45 p.m.

### IP CENTREX AND VOICE ASPs

Everyone's talking about IP voice, but what improvements and applications can the technology bring over traditional voice networks? This session will show you the kinds of features that can be added to an IP voice network through an outsourcing firm. Prem Uppaluru, president and CEO of Telera, leads the discussion.

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# Management Strategies

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## Quitting time

**Resigned to leave your job? Heed this simple protocol before walking out the door.**

BY LISA KOSAN

**W**hen Ted Smith worked at Andersen Consulting years ago, the company documented the tone and terms of each employee's departure. If the resignation went poorly, a "Do Not Rehire" box was checked off in the employee's file.

Now vice president of career markets and services at TechRepublic.com in Louisville, Ky., Smith's job is to guide the site's 750,000 IT members through smart career decisions. That means making sure those damning little boxes don't get checked, bridges don't get burned and doors aren't forever closed because of a poorly executed resignation.

"If the box gets checked, you don't get another chance," Smith says.

As the hot economy encourages IT professionals to hop from job to job — and sometimes back again — with promises of meaty paychecks, flexible work schedules or box seats to the World Series, it's critical to remember that how you leave your current job will affect future opportunities.

"There are important politics and essentials about moving on and moving up in the IT world," says Beverly Kaye, co-author of *Love 'Em or Lose 'Em: Getting Good People to Stay*, and president of Career Systems International, a retention consulting firm in Scranton, Pa. "It harkens back to some age-old wisdom our mothers taught us: Don't leave a trail of dust and bones behind you."

In other words, always leave on a positive note, she says. Make sure your resignation doesn't shock anyone and doesn't send co-workers scurrying to tell their friends what a jerk you are. While rules are broken all the time when a dream job suddenly opens up, the basic protocols to resigning should be followed.

Smith says to raise your hand early on and tell your boss if your job isn't everything you desire. Even if you've decided that you can't stand to do what you're doing for another day, be professional: Don't announce on Friday that you're starting a new job on Monday.

"There's a breed of recalcitrant employees who are

indifferent to proper resignation procedures," says Mark Oldman, co-founder of New York's Vault.com, a resource site for job seekers, human resources professionals and employers. "Especially in the IT world's somewhat small circle of people, it can come back to haunt you."

If you're mad as hell at your boss, resist the urge to criticize your supervisor or your company, especially in writing, says Oldman, who's heard stories about venom-filled letters being passed around the office before landing permanently in a personnel file.

Smith advises junior members of the IT workforce to consider their boss's perspective. "Someday they may be in this man's or woman's shoes staring at a resignation letter," he says. "They need to think if this is how they want to be treated."

Dave Gerstenlauer has accepted his share of resignations, including two in the past few months. As director of network development for Ikon, the office printing and copier giant, he faces a 20% employee shortage among IT workers in the Atlanta area where he's based. "There's only four people to fill every five jobs," he says. "People think they're going to greener pastures."

Before they hand in a resignation, Gerstenlauer advises employees to consider the big picture of their careers, and to assess the intangible aspects of any

new job. How much travel is involved? Is there potential to work from home? Are hours flexible enough to make it to your son's baseball game?

"These are the things that are really difficult to put a value on," Gerstenlauer says. "But if you figure them into the equation, maybe a couple of dollars less in salary is worth more."

### Some resignation do's and don'ts

- Approach your immediate supervisor first, and be prepared with a list of bullet points you want to address, Vault.com's Oldman says. Rehearse what you say in front of friends, adds Career Systems International's Kaye. Both techniques will keep you in control of the discussion.

- Don't leave on bad terms. Provide at least two to four weeks' notice, and present a transition plan.

- Write a short letter of resignation that includes the date you've decided to leave. Don't feel compelled to say where you're going, but do highlight what you've learned.

- Don't get personal. "Your parting words will follow you wherever you go," Oldman says. "You want to leave your job sending the impression that you're a positive, constructive person on the move."

- Stay composed, Oldman says. "Expect that your boss may be surprised and may even feel betrayed," he says.

- Don't resign via e-mail. It's the coward's way out, the experts agree.

- Tell your boss why you're leaving. Employers are desperate to retain talented IT workers and want to know what went wrong.

- Don't poach former colleagues once you've left. "E-mailing employees who've remained ... that is the ultimate betrayal," Oldman says.

*Kosan is a freelance writer and editor in Beverly, Mass. She can be reached at [lkosan@mediaone.net](mailto:lkosan@mediaone.net).*



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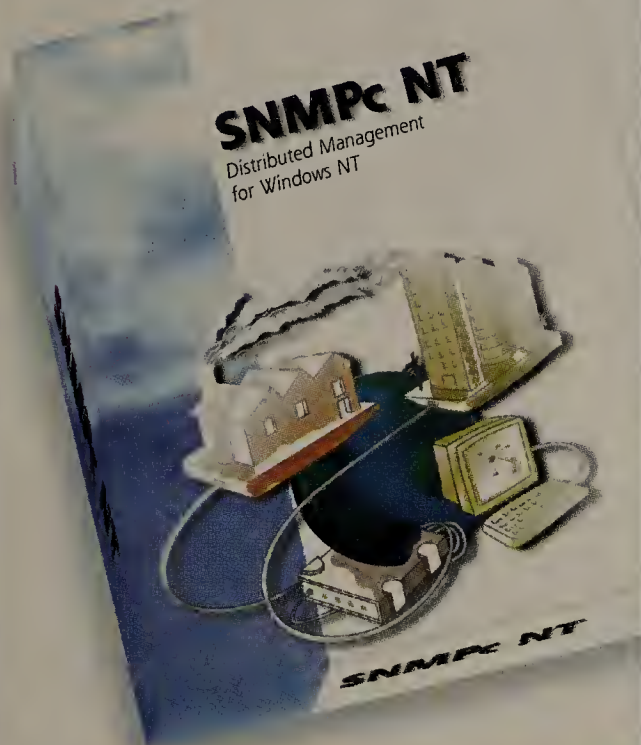
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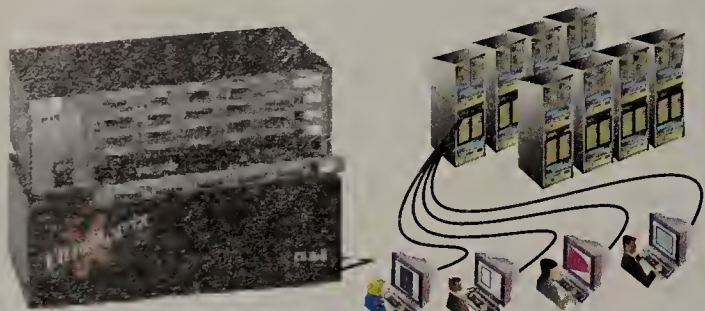
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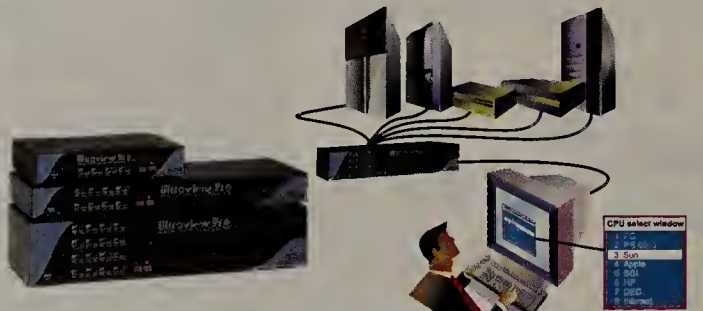
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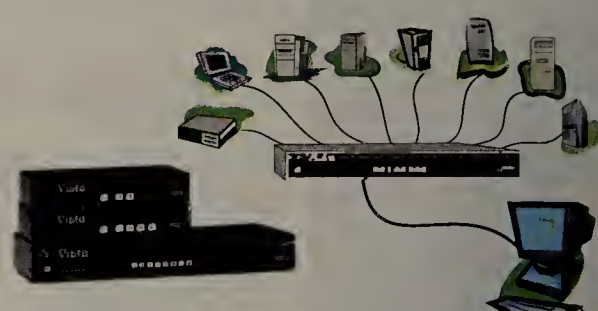
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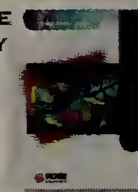


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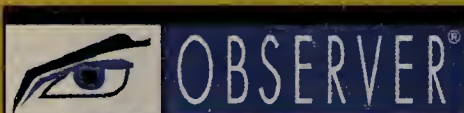
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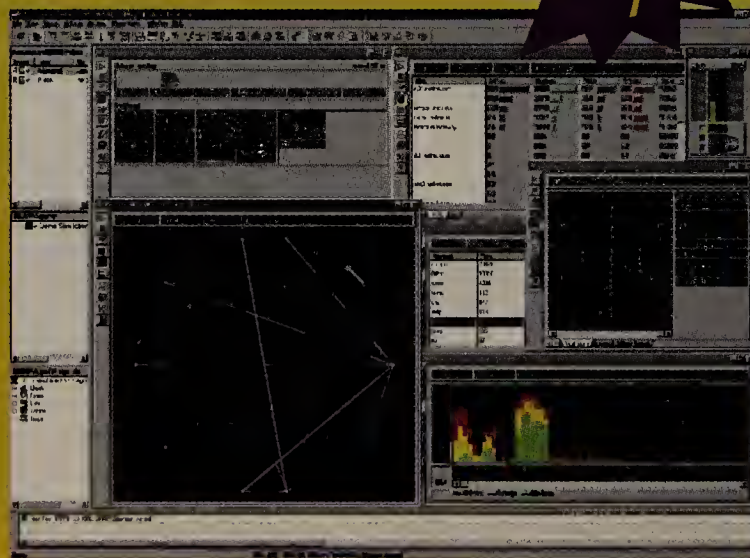
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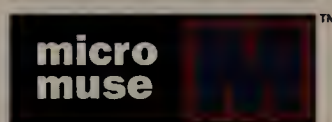
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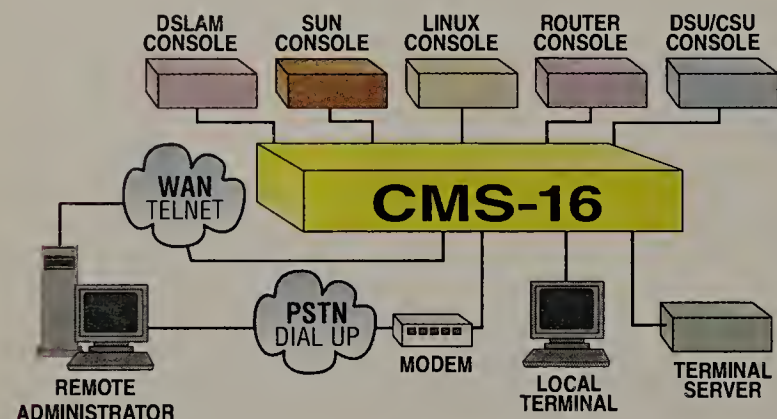




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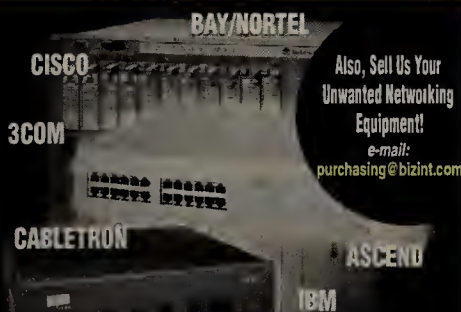
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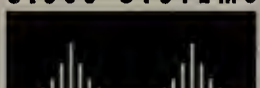
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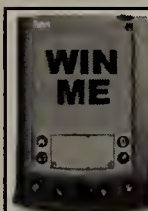
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Provide services to clients in design & development of multi business applications to support client-server systems, develop modules, modify, test, & implement systems, working with Digital Alpha Servers, IBM compatibles, Unix, Oracle, Oracle\* Forma, Oracle\* Reports, Oracle\* Financials, SOL\* Plus, PL/SOL, SQL & Windows NT. \$62,920/yr. 40hrs/wk. B. S. in Computer Sc., or Computer Eng, Math, or Electrical or Electronics Engineering req'd. 2 yrs. exp. req'd. in job offered or 2 yrs. related exp. as Systems Analyst or Software Eng. Related exp. must include use of noted skills in job duties. Will work at unanticipated locations in the U.S. Submit 2 resumes or apply to the GA Dept. of Labor, 2943 N. Druid Hills Rd., Atlanta, GA 30329-3909 or the nearest Dept. of Labor Field Service Office. Job Order #GA6736150.

### Computer Scientist Data Mining

A Charlotte Financial Information Services Company has an opening for a Computer Scientist-Data Mining. This position will design and implement intelligent data mining systems that extract information from electronic sources of financial data. Consult with financial analysts to translate their experience into heuristic rules of data mining. Track latest technology, innovations and standards in financial data mining. Develop in Windows NT, SOL server and Delphi environment. Requires a BS in Computer Science or Applied Mathematics and three years experience in job or as research assistant. Required experience must include heuristic research and applications. The company will not pay for relocation. Send resume to HR Director, 5250 77 Center Drive, Suite 150. Charlotte, NC 28217. EOE M/F/D/V.

Sr. Systems Analyst  
Provide services to clients involving design & development of multi real-time applications to support client - server systems & information; d/redesign & modify current systems to comply with year 2000 data requirements & volume growth; test & implement applications, working with WindowsNT, Unix, SQL Server, Oracle, Presentation Manager, JAVA, C++, Visual Basic, MFC (Microsoft Foundation Class), Windows SDK & Object Oriented technology. \$62,920/yr. 40 hrs/wk. B. S. in Computer Sc., or Computer Eng, Math, or Computer Applications req'd. 2 yrs. exp. req'd in job offered or 2 yrs. related exp. as Systems Engineer or Software Consultant. Related exp. must include use of noted skills in job duties. B. S. may be foreign equivalent degree. Will work at unanticipated locations in the U.S. Submit 2 resumes or apply to the GA Dept. of Labor, 2943 N. Druid Hills Rd., Atlanta, GA 30329-3909 or the nearest Dept. of Labor Field Service Office. Job Order #GA 6736134.

SVI AMERICA CORP. is an information management & technology consultancy co. with offices throughout the US. We work with many organizations to develop integrated solutions that transform their enterprises. By understanding the key components that drive an organization, we are providing tangible results & a competitive advantage to our clients.

SVI America Corp. presently requires Programmer Analysts with the following qualifications: A Bachelor's degree in Comp Sci, Math, Eng'g, Business Admin. or a related discipline, 1 yr exp in job offered, and working knowledge of Visual Basic, RDBMS & SOL. Must be willing to temporarily relocate to client sites throughout the U.S.

To apply, please contact: HR Dept., SVI America Corp., 15800 John J. Delaney Drive, Suite 250, Charlotte, NC 28277 or E-mail: [jobs@sviamerica.com](mailto:jobs@sviamerica.com)

Software Engineer. Researches, designs, and develops customized computer software in a object-oriented environment. Software controls company produced hardware used in the manufacture of semiconductors. All software developed using object oriented technology, C/C++ and running in real-time. Software will include image processing, computer vision, step motors and other electrical or electronic device controls. Designs and develops software system testing procedures, programming and documentation. REQUIREMENTS: Masters Degree in CS/EE plus 3 years experience and or Bachelors and 5 years of progressive experience in the job offered or related occupation of (software development in an educational or industrial research). Experience must include C/C++, Object oriented methodology and real-time software. 40 Hrs/wk from 8am-5pm. Salary: \$65,550.00/year. Please send resume to: Job Order #2000-409, P.O. Box 989, Concord, NH 03302-0989.

Full-time Programmer Analyst. To design, develop, test, implement, maintain and support client/server based software system & database for business application using Visual Basic, Magic, Oracle, on Windows NT/98, RDBMS, Magic software, and web authoring. Will evaluate program's needs of user and consult with user to identify operating procedures in programs objective write code, test programs for logic and syntax error, correct code, train user, tuning Magic application performance. Must have a Bachelor's degree in Computer Science (foreign degree accepted). Must have 3 yrs experience in job offered or a position with the same duties. Salary: \$59,774/yr. Send resume to: Nanda Chheda, American Megatrends, Inc., 6145-F Northbelt Parkway, Norcross, GA 30071.

### INFORMATION TECHNOLOGIST:

Int'l Specialty Products, one of the world's premiere specialty chemical companies, encompassing all aspects of chemical prod. & sales incl. manufacturing & research facilities, is seeking an Information Technologist to analyze, design, code, test, enhance, maintain & document AS/400 applications. Qualified applicants will have a Bachelor degree in Computer Science or a related discipline & have 5 yrs of related exp w/extensive knowledge of RPG, CL, QUERY, SQL, MRC & AS/400. Send resume to: Ms. Irene Coontz, Int'l Specialty Products, 1361 Alps Road, Wayne, NJ 07470.

### ORACLE Applications Database Administrator

Kaplan, Inc. is the world's premier provider of educational products and services. Currently our company seeks an ORACLE Applications Database Administrator. Qualified applicants must have a BS degree in Computer Science, Engineering or rel. disc. & 3 yrs exp in job offered or as a DBA, soft eng., or in a rel. occ. Must have exp w/UNIX, SOL, and ORACLE products incl. ORACLE Financial, Enterprise Manager, Network Manager, Replication Manager, and Server Manager. Send Resumes to: Ms. Preeti Torres, Kaplan Educational Centers, 888 Seventh Ave., 21st Floor, New York, NY 10106.



Software Engineer wanted by Consultant Placement firm in New York, NY. Must have Bach. in Comp Sci or related field & 2 yrs exp.

Respond to: HR Dept, StratPro Limited, 1270 Avenue of the Americas, Ste 415, New York, NY 10048.

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**Kama Consulting**  
Fax: 201-934-7166  
Email: Kamaco@aol.com

Quality Assurance Analyst wanted by New York-based Risk Mgmt. Service Co. to test s/ware applications. Must have Bach in Comp Sci, Elec Engg or Math & 1 yr s/ware exp in job offd.

Respond to: HR Dept, Measurisk, LLC, 342 Madison Ave, Ste #710, New York, NY 10173.

**DATABASE ANALYST:** Interactive Edge, the leading developer of sales presentation & analytical data-management software for the consumer packaged goods industry, is seeking a Database Analyst. Qualified applicants will have a Master's degree in Comp Sci or related discipline & must have knowledge in MS Access, Oracle, C/C++, UNIX & Java. Send res to: Ms. Francine Ferreira, Interactive Edge, 7 West 18th St., NY, NY 10011.

Engineering Opportunities-Dataware Technologies, Inc. has the following positions available at all levels for their offices in Cambridge, MA and Hadley, MA: Software Engineer, Software Engineer-Multi-Lingual, and Product Designer. Please forward resumes to: Dataware Technologies, Inc., Professional Staffing, One Canal Park, Cambridge, MA 02141, e-mail at hr@dataware.com, or fax to (617)494-0740. We believe in the power of diversity. For more information, please visit [www.dataware.com](http://www.dataware.com)

**SOFTWARE ENGINEER** - All required assistance w/ regard to research, analysis, designing, re-engineering, implementing & testing application systems and subsystems in client/server architecture, design & develop graphical user interfaces; train users. Env: WinNT, Oracle Financials & Manufacturing. MS deg any field w/3 yrs exp in job /related occupation or BS/BA any field w/ 5 yrs exp. 40 hrs/wk. Salary competitive. Resume to DataLogix, Inc. 103 Europa Blvd., Cherry Hill, NJ 08003

Synergy America, Inc. has multiple openings available for Prog/Sys Analysts, S/W Engineers, DBAs & Sys Admins to design/develop applications in one of the following areas: VB, VC++, COBOL, SQL, JAVA, HTML, Oracle, Informix, Sybase, Internet & wireless technologies, Windows, UNIX. All positions req BS/MS or equiv in Science, Engg or Bus. Combination of edu & exp will be accepted. Highly competitive salaries & benefits. Travel/reloc.req. Resumes to: HR, 1565 Woodington Cir. Suite 101, Lawrenceville, GA 30044.

Software Technical Services, Inc. has immed multiple openings for exp'd Prog/Sys Analysts, S/W Engineers and DBAs in the following areas: AS/400, Mainframes, COBOL, VB, Oracle, Oracle Financials, Sybase, JAVA, HTML, SAP, Internet Tools, PeopleSoft, Database/UNIX admin. Salary: \$60K-\$90K. Travel/reloc. req'd. All positions require BS/MS in CS/Engg/Bus Admin/Math or related field. Foreign equiv. of ed. and/or combination of exp and ed. will be accepted. Resumes: HR Dept, 105 Nobel Ct, Alpharetta, GA 30005

Multiple FT positions open for exp'd Prog/Analysts and S/W Eng. DBAs skilled in some of the following: VB, HTML, JAVA, COM, IIS, ASP, Oracle, Developer 2000, Sybase, Windows NT, UNIX, Database/UNIX Admin, etc. All positions req. a BS/MS in CS/Engg (any branch) or related field (or its foreign equiv. in ed. & exp). Highly competitive salary. 60% travel involved. Send resumes to: InfoSmart Technologies, Inc. 385 Leatherman Ct. Alpharetta, GA 30005

High-tech Co. in Denville, NJ looking for F/T h/ware & s/ware engineers to dsgn & dvlp data communication h/ware & s/ware for Global System Mobile (GSM) communication cellular n/works incl dsgn & dvlp either Radio Frequency (RF)/Analog/Digital h/ware or s/ware for Digital Signal Processor (DSP) & Microprocessor using C, C++ or Assembly under WinNT. Req. MSEE, MSCE or MSCS. Send resume to Metron Communications Corp, 66 Ford Rd, Ste 220, Denville, NJ 07834 or fax/email to: 973-983-9836/hr@MetronComm.com

Systems Engineer wanted by S/ware Dvlp Co in New Hyde Park, NY. Must have Bach in Engg, Math or equiv & 2 yrs exp configuring Lotus Notes & installing, configuring, testing & administering Win NT/LAN. Respond to: HR Dept, CLK Networks, 211 Central Blvd, New Hyde Park, NY 11040.

Business Analyst needed for NJ IT Co to research, analyze & advise emerging trends in e-commerce, e-business & IT. Apply to Global Consultants, 601 Jefferson Rd, Parsippany, NJ 07054.

Computer Programmer wanted by Consultant Placement firm in New York, NY. Must have Bach. in Comp. Sci. or related field & 2 yrs. exp.

Associate Computer Systems Engineer wanted by Computer Consulting Firm in New York, NY. Must have Bach in Mgmt, Info Sysms or Comp Sci & 1 yr comp exp.

Respond to: HR Dept, DR, PO Box 4241, GCS, NY 10163.

Programmer/Analyst wanted by Business Software Solutions Co in Hopkinton, MA. Must have BS in Comp Sci & 1 yr s/ware exp.

Respond to: HR Dept, Abraic, Inc., 17 Valleywood Rd, Hopkinton, MA 01748.

Senior Programmer wanted by Security brokerage firm for multiple positions. Must have Bachelor's degree in Computer Science with at least two years experience.

Please send resume to HR Dept., All Tech Direct, Inc., 160 Summit Avenue, Montvale, NJ 07645 or fax resume to 201-782-9327.

Telecommunications & Network Company needs System Network Engineer. Position requires 4 years' experience and a 4-year degree in related discipline. 40/hr. work week. Send resume to: The Lewis Group, Inc., 1070 Highway 34, Suites S, Matawan, NJ 07747

Wavesoft Inc. has 3 full time positions for Prog/Analysts to design, develop, test, implement and support S/W applications using C++, JAVA, HTML, Rouge-wave, Rational Rose, Oracle, Developer 2000 etc on Windows and UNIX OS; consult with users to identify current operating procedures and clarify program objectives; perform unit testing and debugging activities. Require BS or foreign equiv in CS or Engg w/2 yrs exp. in the industry. Salary: \$60K-\$70K. 60% travel to client sites. Send resumes to HR, 875 Old Roswell Rd, Suite B300, Roswell GA-30076.

**SYSTEMS ANALYST-** International Telecommunications Data Systems, Inc. needs Systems Analysts for its Stamford, CT office to analyze and develop telecommunications software. These positions require a masters degree in Math, Computer Science, Engineering or a related discipline and two yrs. exp. in the job offered or in a software development occupation. Must have exp. with C/C++, UNIX and Windows OS, which may be attained through education or employment. Send resume to: ITDS, Box AK, 1390 Timberlake Manor Parkway, Chesterfield, MO 63017, Att: K. Madsen.

Senior Software Engineer (NYC). Design and build Airmedia's next-generation, wireless info. hub w/strong knowledge of Java, C++, UNIX and Oracle. MS in Computer Science is required. Good pay + good benefits. Send resume to HR/SREng, Airmedia.com, 11 E. 26th St, 16th Fl, New York, NY 10010 or email: gtjobs@corp.airmedia.com NO CALLS PLEASE.

Software Engineer needed for NJ Company as following:

Software Engineer: Bachelor of Science in Computer Engineering-with 5 years as Programmer Analyst.

Various skills combinations required: Analyze, Design, Develop, Administer, Test, Implement and Maintain Web Application Systems Using Oracle Financials (Accounts Receivables, General Ledger, Accounts Payable), Oracle Developer 2000 (Forms and Reports), Web Server, Oracle, SOL\*PLUS, PL/SQL, Under Unix and Windows NT Environment.

Apply with two copies of resume to MIS Department, THE NEWARK GROUP, 20 Jackson Drive, Cranford, NJ 07016.

Production and Graphics Manager. ERS Holdings, Inc. is a strategy consulting firm dedicated exclusively to the financial services industry. Currently our company seeks a Production and Graphics Manager. Qualified applicants must have an Associate's degree in Comp or Info Sci, Graphic Arts/Design, or in a rel. disc, & 5 yrs exp in job offered, or as a DTP & Graphics Product Specialist, or in a rel. occ. Must have exp w/computer graphic & presentation design & related DTP software incl Quark Express & Macdraw Pro, & exp w/color presentation hardware & software to recommend best production formats & high quality standards. Must be willing to travel to Canada & Europe 4 times/yr for 5-7 days at a time. Send Resumes to: Ms. Rachel Kirsh, ERS Holdings, Inc., 1155 6th Avenue, 11th Floor, New York, NY 10036. Code: RK/SD

Sr. Object Developers to lead & manage teams to architect, design & build Internet based distributed multi-tier applications using MS Visual C++, COM, TIBCO Middleware, SQL Server, Internet Protocols, XML etc on Windows NT; design scalable data models to support applications & develop multithreaded applications using TCP/IP sockets; provide technical & business guidance for complex user problems; evaluate/mentor team members & provide proven methodologies and structures for application development. Require MS or its equiv in CS or Engg with 1 yr exp in the field. Salary: \$75,000 full time. Resume to: Mr. Eric Presley, VP of Tech, Headhunter.net, Inc, 333 Research Court, Suite 200, Norcross, GA 30092.

The Boston Group, a global provider of software and internet based e-commerce solutions, is seeking motivated IT professionals specializing in:

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**IRIS Associates**, the creator of Lotus Notes, Lotus Domino and Lotus Domino Designer, seeks to fill a number of Software Engineering positions at various levels of responsibility at our location in Westford, MA.

All positions require a BS degree (or equivalent) in Computer Science or other relevant field, together with at least 4 to 7+ years' relevant experience.

**Senior Software Engineer (QuickPlace Internals)**

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**Principal Software Engineer (Notes Client Editor)**

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**Principal Software Engineer (Lotus-Iris Products Designer/Server Administration)**

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**Project Manager (Domino Web Engine)**

- Multiplatform, HTML, DHTML, Javascript

**Numerous Other SWE Positions/Levels**

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Competitive benefits and starting salaries from \$57,250-\$102,600, commensurate with the position's specific responsibilities, accompany this exciting high-tech environment growth opportunity.

Please mail or fax your resume, indicating Reference Code

"IMSP," to: Iris Associates, Attn: Human Resources, Five Technology Park Drive, Westford, MA 01886; Fax: 978/392-6060. Email: [Irisimspjobs@iris.com](mailto:Irisimspjobs@iris.com)

Visit: [www.iris.com](http://www.iris.com). Iris Associates, a subsidiary of Lotus/IBM, is an Equal Opportunity Employer.

Systems Analyst; Jackson, MS: Provide data processing solutions to bus. opportunities in mission critical systems. Provide technical expertise, assistance in coding & informal leadership in sys. development, maintenance & production processes. Recommended improvement to bus. processes, procedures & methodologies. Provide project leadership. Provide guidance in bus. analysis, tech. design, coding & testing to develop software eng. solutions to bus. problems. Assist w/ software design reviews for major project areas. Coordinate & facilitate meetings with users to validate requirements, designs, prototypes & test results. Analyze & design solutions to complex tech. problems w/ staff & vendors. Code, test & implement solutions. Identify & recommend sys. enhancements & performance improvements. Recommend work process improvements. Assure compliance w/ development standards. Recommend solutions to users & staff on technical issues related to database design, software coding techniques & development of life cycles methodologies to meet bus. objectives. Guide & support the application system planning process. Conduct & participate in review, evaluation & recommendation of software products, productivity tools & external services. Apply knowledge of RPG, RPGLE & CLP on AS/400 platform. Master's in Computer Science. 40 hrs per wk. \$55K per year. Resume to M. Cravey, SkyTel, 200 S. Lamar St. Jackson, MS 39201

Systems Administrator (Multiple Openings): Implement and administer clustered enterprise UNIX/SUN Solaris systems and Oracle Databases; plan backup and disaster recovery procedures; RAID arrays using a Veritas Volume Manager; and shell scripts and systems migration procedures. Req: Bachelor or foreign equiv degree in Information Science, Computer Science or related discipline plus 1 year in job offered or 1 year in related occupation as Technical Consultant, ORACLE DB Administrator, UNIX Systems Administrator or any suitable combination of education, training and/or work experience. Hrs: 8a - 5p, M-F Send resume to Moorecroft Systems, Inc., 202 Abbey Court, Alpharetta, GA 30004. Reference No. DB001.

Value SAP Product Manager at SAP America, Inc.-Strategic planning, development and marketing of ValueSAP implementation tools for SE US & Latin America. Manage SAP product roll-out process and supervise consultants. Travel up to 70% nationally & internationally. Utilize expert knowledge of SAP implementation tools & processes. Position requires Bachelor in B. Adm., Mktg., C.S., or related field & at least 2 yrs. exp. in business process automation projects support, w/1yr. in ASAP implementation for SAP R/3. Must have 1 yr. exp. in software development management. Send resume with reference to Job Code: G0008/AJC/161, to [a.black@sap.com](mailto:a.black@sap.com) or fax to 404-943-2825.EEO/M/F/D/V. No phone inquiries.

Web Designer. Job location: New York, NY. Duties: Responsible for the conceptual development, design, creation & technical production of internet site according to specifications, & using design software such as Adobe Illustrator, Adobe PhotoShop, Adobe Premier, Adobe After Effect, Macromedia Director, Macromedia Dreamweaver, Microsoft Word, Microsoft Excel, Microsoft PowerPoint & OuarkXpress. Work closely with creative director to develop branding strategy for web site project. Requires: Master's in Graphic Design or related field, incl. Coursework in Graphic Design & Info. Environments. Send resume to Teri Allen, marchFIRST, Inc., 311S. Wacker Drive., Suite 3500, Chicago, IL 60606.

Job # WEB 122740--Programmer Analyst needed to develop software systems, applying computer science, engineering and mathematical analysis using C, C++ and Java. Analyzes software requirements and performs testing and user training after development. Work involves extensive travel and frequent relocation. Must have Bachelor's degree in one of several limited fields: engineering, mathematics, physics, computer science or chemistry. Must have at least 1 year of experience as a computer professional using C, C++, and Java. 40 hrs/wk, 9-5, M-F. \$75,000/year. Send resume, referencing above job # to Mr. James J. Mackin, Manager, Beaver Falls Job Center/TPCL, 2103 Ninth Avenue, Beaver Falls, PA 15010-3957

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**Database Administrator, Santa Ana, CA:** Conduct logical & physical data modeling using CASE tools & capacity analysis for software & software purchasing w/in MS NT & IBM AIX Unix environ. Develop strategies for storing product data offline, conduct analysis & implement design of objects in n-tiered application framework, program, refine & troubleshoot advanced transact SQL stored procedures & triggers, comply w/dbase development stnds, use dbase replication software for movement of data to subscribing servers, use dbase auditing for audit & security guidelines, create procedures & reports for dbase & Unix admin. tasks, use monitoring tools to update & refine dbase & operating systems, & create & admin. Project plans for hardware & software upgrades. Reqs. Master's in comp. sci., MIS or related field (in lieu of Master's we will accept Bachelor's plus 5 yrs. progressive exp. w/in field) and 2 yrs. in job offered or as Computer Consultant, Dbase Admin. or Technical Architect. The 2 yrs. req'd exp. must have included develop. & implementation of Dbase platforms, incl. Sybase, SQL Server & Oracle (future standard); work w/operating systems, incl. Unix IBM AIX & Sun Solaris & MS NT; Dbase tools, incl. logical modeling, physical modeling, CASE Sybase powerdesigner or a related tool; capacity planning & SQL backtrack (Dbase backup); & front-end tech., incl. SQA teamtest. \$108,000/yr. 40 hrs./wk., M-F. Send this ad and your resume/letter of qualifications to Job #MJC 50973, P.O. Box 269065, Sacramento, CA 95826-9065.

## ENGINEERING

The San Francisco office of Charles Schwab & Co., Inc. has staff, Sr. Staff and Director career opportunities in the Schwab Information Technology Enterprise. Specific disciplines include Database Administration, Systems Programmers, Programmer Analysts, Information Security Specialists, System Administrators, Architects, Project Managers, Systems Engineers and Network Engineers. Technical Environments: NT, UNIX, (Solaris, AIX, HP-UX), MVS, CICS, CICS/6000, SNA, C, C++, COBOL, Powerbuilder, SQL DB2, Oracle, PeopleSoft, Firewalls, Visual Basic, Java, JavaBeans, ActiveX, J++, CGI Scripting, HTML, SILK, QA Partner, CORBA, DCE, HP-Openview, NewBridge, Tivoli, Remedy, Legato, Periphonics, CTI, Parallel Sysplex, LDRPS, MQ, NetIQ, ATM, PBX, Electronic Output, Cisco, Sendmail, Imaging, Electronic Messaging, AFP. We offer the competitive salaries, excellent incentives and the comprehensive benefits of a recognized industry leader. Email your resume, indicating Job Code Sk991C to: [chwab.jobs@chwab.com](mailto:chwab.jobs@chwab.com). Charles Schwab & Co, Inc. Member SIPC/NYSE. 0300-5070. Equal Opportunity Employer

**Sr. Software Engineer** sought by IT consulting company in Greenwood Village, CO to, at a senior level, engage in full life-cycle software development. Specifically, design & develop client/server & web-based software applications that interface with ORACLE relational database management systems, & other databases, & run on UNIX &/or Windows NT platforms. Analyze requirements. Create designs & design documentation. Code, test, & debug the software applications. Use WinRunner testing & development tool, TSL programming language, Visual BASIC, Shell scripting, ORACLE\*Forms, & ORACLE\* Reports, HTML, & JAVA script in the design & development process. Requires Master's, or equivalent in Computer Science or a related field. Specifically, it requires a Master's or foreign degree equivalent, plus 3 yrs of progressively more responsible software development experience, or a Bachelor's, or foreign degree equivalent, plus 5 yrs of progressively more responsible software development experience. Working knowledge of WinRunner, ORACLE, & Visual BASIC. \$66,100/yr; M-F; 8am-5pm. Respond by resume to James Shimada, CO Department of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202, & refer to Job Order No. CO4677894.

**Sr. Systems Analyst** sought by software consulting & development company in Westminster, CO to, at a senior level, install, implement & customize company developed & third-party systems management products to run on UNIX, Windows NT & VMS systems. Integrate new systems management products with Legacy software applications & systems. Complete onsite testing of implementation. Train systems administration & users, & prepare onsite documentation regarding implementation & use of system management products. Manage onsite projects as needed. Liaison with Development team regarding market needs & trends for new system management products. Requires Master's in Computer Science or Engineering (include Mechanical Engineering); 3 yrs experience performing the core duties & using the technologies described above. \$72,700/yr; M-F; 8am-5pm. (2 openings) Respond by resume to James Shimada, CO Department of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202, & refer to Job Order No. CO4677907.

**Database Administrator** sought by software development company in Englewood, CO, to work in Flushing, NY & other unanticipated job sites in the U.S., to coordinate physical changes to ORACLE & Sybase databases running on UNIX & Windows NT platforms, applying knowledge of database management & design. Design & establish physical database parameters. Install & configure physical database. Specify user access & security for databases. Implement backup & recovery procedures. Test & correct errors, refine changes to database, monitor database performance, & engage in performance tuning. Use Sybase Server Manager in the administration tasks & the ERWin data modeling tool. Provide user support. Requires Bachelor's, or foreign degree equivalent, in Computer Science; 2 yrs experience performing the core duties & using the technologies described above. \$62,000/year; M-F; 8am-5pm. Respond by resume to James Shimada, CO Department of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202, & refer to Job Order No. CO4677449.

**Software Engineer** with experience in the following: Windows NT & UNIX, ERP, Oracle, PL/SQL, Shell Scripts, Pro\*C, Mercator.

Contact: Optum, Inc., 3330 Harbor Blvd., Costa Mesa, CA 92626 or Fax (714) 557\*1440. Submit resumes at [jobs@optum.com](mailto:jobs@optum.com)

**SAP Consultant, Broomfield, CO:** Implement SAP R/3 systems for HR, FI, MM modules. Perform data modeling and data flow definition for data migration and interface development. Develop EDI (Electronics Data Exchange) interfaces using SAP IDOCS. Design and develop client/server applications using Powerbuilder, Oracle RDBMS and Unix scripts. Provide development and maintenance support in SAP environment. Req'd. Bachelors in Comp. Scie. or Math or Engg. 2 yrs exp. in job offered or 2 yrs. exp in any Computer Related Profession. 40 hrs/wk., 9a-6p., Mon-Fri., \$80,000/Yr. Must have proof of legal authority to work in the U.S. Mail resumes to: Colorado Department of Labor & Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117. Job Order

**BEST consulting** seeks Bus. Dev't/site Mgr based out of Seattle Hdqtrs office. DES: mge & direct proj. dev't. teams to iner. & enhance bus. info. sys. efficiency for crprate clients; Cndct tech. sales & bus. dev. mtngs w/ potential clients; Analyze clnt reqs & make recs to improve existing sys.; Cndct init. tech. intvw. & screening for prosp. personnel & assign, coord. & rrv wk of on site personnel. Util. cmplx RDBMS, SQL, hi-level prog. lang., & 32 bit mltskng/mlt-threades o/s. REQ: BS or MS in Comp. Sci., Engin., Math or Phys + exp. in the duties of the job offered, or exp. des., dev. & imp. RDBMS & related apps. util. SQL, hi-level prog. lang., & 32 bit mltskng/mltthreaded o/s. In addtn, 2 yrs. of exp. suprvng & dirctng prof. dev. teams thru full life cycle info. sys. des. & imp. w/h a large crprate envnmt. Exp. may be gained concurrently. Prem. sal. offered, plus bonuses & bens. Please reply to J. King, Job #CCL-78, BEST Consulting, 11255 Kirkland Wy., Kirkland WA 98033

**Programmer/Analyst** sought by software consulting company in Englewood, CO, to design, develop, implement, upgrade & troubleshoot software applications that access ORACLE relational database management systems on UNIX & Windows platforms. Analyze user requirements. Create custom designs & application extensions. Code, test, debug, implement & support the software applications. Use ORACLE Financials & SQL in the design & development process. Requires Bachelor's or foreign equivalent in Computer Science or related field (including Communications Engineering); 1 yr experience designing, developing & implementing computer software applications that access ORACLE relational database management systems on UNIX & Windows platforms using ORACLE Financials & SQL. \$70,000/yr; M-F; 8am-5pm. Respond by resume to James Shimada, CO Department of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202, & refer to Job Order No. CO4677841.

**Manager-Computer Operations** wanted by Builder of Transactional eBusiness in Santa Clara, CA. Must have Bach in Comp Sci or Mechanical Engg & 2 yrs exp dsngng, installation, implementation, maintenance, support & mgmt of info tech systems. Respond to: Derek Archer VP. World Operations, World-chain, Inc., 3235 Kifer Rd, Ste 340, Santa Clara, CA 95051.

**SCS America (BrightStar) is searching for SAP analysts with the following requirements:** SAP experience in FI, CO, AM, PS, HR, SD, MM, WM, PP, QM, SM, Basis or Abap/4. Also looking for Business Analysts and J.D. Edwards Functional Consultants. Positions available throughout the U.S. Extensive travel and possible relocation involved. Send resumes to: BrightStar IT Group, 950 Tower Lane, Suite #1750, Foster City, CA 94404 or e-mail to: [resumes@brightstar.com](mailto:resumes@brightstar.com)

## Systems Analyst

### Programmer Analyst

Expertise in either SAP, SYNON

or J.D. Edwards. Submit your

resume to: Apria Healthcare,

3560 Hyland Ave., Costa Mesa,

CA 92626, or E-mail to:

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**SAP Senior Basis Consultant** Experienced in all phases of system development life cycles, including ASAP methodology. Must reside in Chicago area to provide 7x24 support to client. In-depth technical knowledge of UNIX/Oracle platforms, SAP R/3 versions 3.0F, 4.0B and 4.6B; SAP R/3 Banking version 4.01C; SAP BW version 1.2B and SAP communications using ALE. Respond by resume to: Jocelyn Freimark Symmetry Corporation Fax: 414-274-3111 E-mail: [joc@sym-corp.com](mailto:joc@sym-corp.com)

**Senior Software Engineer:** Design, develop, test, implement & maintain databases & software application components for customized software products using C++, MFC object framework, MS-Windows, SQL, ODBC database drivers, Microsoft Access & Jet Database Engine. Direct & manage the design, development & implementation of business software applications & specialized systems/programs for internal &/or external use. Validate client functional design requirements, create project plans & specify timelines & resource requirements. Investigate & select software tools, create the user interface design specifications & complete the functional object analysis. Create high level architecture & module designs, design &/or modify & implement the relational database. Complete detailed module design & implement software objects & components in C++. Unit test & integration test the completed software package & validate the system test design requirements provided by quality assurance. Develop software installation &/or upgrade procedures, manage defect reports & change requests impacting the software. Must have a Bachelor's degree in Computer Science. Must have at least five years of experience in the job offered or as a Software Engineer. Experience as a Software Engineer must include software & database design & development using C++, MFC, MS-Windows & SQL. 40 hrs/wk, 9:00am - 5:00pm. Overtime required as needed. \$87,500/yr. Overtime pay example. Applicants must show proof of legal authority to work in the U.S. Send resumes to the ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 7 North, Chicago, Illinois 60605. Attention: Lydia Clarke. Reference # V-IL 23617-E. AN EMPLOYER PAID AD. NO CALLS -- SEND 2 COPIES OF BOTH RESUME & COVER LETTER.

**Systems Analyst** wanted by Life insurance Co in Omaha, NE. Must have BS in Comp Sci, Elec Engg or equiv & 1 yr comp exp.

Respond to: HR Dept, Jefferson Pilot Financial Insurance Co, 8801 Indian Hills Dr, Omaha, NE 68114.

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**Systems Engineer** wanted by Tech. Consult Firm in Schaumburg, IL. Must be Computer Major w/Master's Degree or Bachelor's Degree and 5 yr. prog. exp.

**Respond to Future Technology Solutions, Inc.,** 870 East Higgins Road, Ste. 135, Schaumburg, IL 60173.

**Systems Analyst** wanted by Info Technology Co. in South Barrington, IL. Must have Bachelor's Degree in Comp Sci or Info Mgmt & 1 year s/ware exp.

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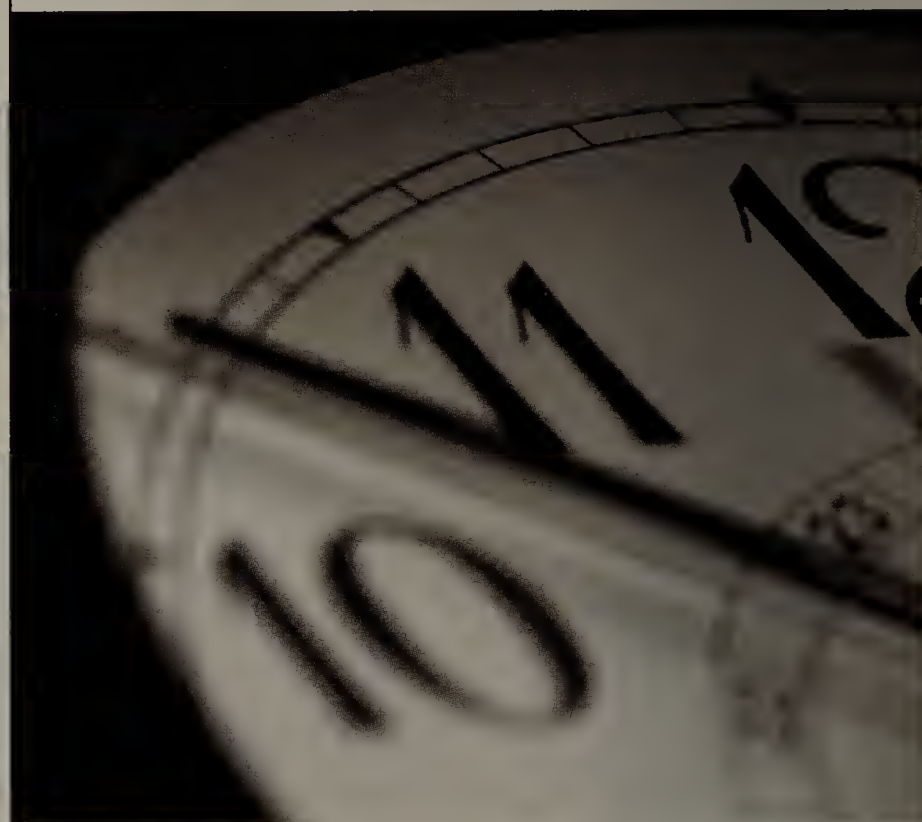
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## **Cidra Corp. Houston, TX**

Mix leading-edge technology with the oil industry, and there's bound to be a gusher of opportunity. Cidra Corp. in Texas designs and manufactures fiber-optic sensing systems for the oil and gas industry. The corporation's operations in Connecticut design and manufacture tunable devices and components for the telecommunications industry.

Founded in 1996, Cidra's optical-sensing technology is being put to work for customers such as BP Amoco. "Our fiber-optic sensing equipment has taken the place of the copper tube that previously was snaked down during drilling," explains Kieran Portley, technical recruiter. "We capture the data to determine such factors as the oil-to-water ratio and what's going on below the surface."

Portley is looking for IT professionals with experience in C, C++, DCom, MSC and data warehousing. Specifically, he will be hiring a senior technical team leader and a requirements test engineer. "Communication skills will be important because we are working with engineers who know down-hill drilling. We're helping them define requirements and applying technology to those requirements."

"Cidra is developing and manufacturing state-of-the-art technology and products, so our employees have the opportunity to work with the latest software, systems and middleware," Portley said. "Our company is employee-owned – every employee has stock options. As a result, throughout Cidra you feel a strong sense of passion and commitment for the technology we develop and the products we deliver our customers and partners."

## **ThruPoint Dallas, TX**

ThruPoint, headquartered in New York and founded in 1996, now has offices to serve the Southwest in Dallas, Houston and Phoenix. The company provides advanced inter-networking solutions and services to help clients design, deploy and manage their computer networks.

"Our clients are primarily large, global companies that are sophisticated, early adopters of new technology and that view their networks as a critical part of their overall business strategy," explains John Trebisky, regional recruiter. Both Morgan Stanley Dean Witter and Cisco Systems hold a stake in the company, which is in pre-IPO operation. ThruPoint also has offices in London, Amsterdam and Frankfurt.

"By providing network engineers to our customers, we assist them with security audits, network design and implementation of large network systems," says Trebisky. The company hires all engineers on a full-time basis, and stock options are awarded as part of becoming an employee.

In addition to providing professional staff to Morgan Stanley, the company's Texas clients include Enron and Cisco. "Typically we do projects, working with the CIO to resolve business problems, build prototype models and then build the network. We need people who have strong analytical skills, project management and communication skills."

"We're also looking for Cisco certifications, particularly the CCIE," says Trebisky. "That's considered the doctorate in Cisco network technologies, and there are only about 4,000 such folks in the world. While we seek that level of expertise, we also hire people who may have some certification or none, but who are willing to work toward that goal."

Trebisky says ThruPoint does three things that attract engineers and keeps them with the firm. "We pay people well," he explains. "Our base salary is in the 90th percentile of the market. We also offer year-end bonuses and discretionary stock bonuses on the quarter. Secondly, we offer the opportunity for training. Each engineer sits down on day one and completes a structured training plan. And lastly, we give ownership to people who work here."

For more job opportunities in Texas, turn to the pages of IT Careers.

If you'd like to take part in an upcoming IT Careers feature, contact Janis Crowley, 650.312.0607 or [janis\\_crowley@itcareers.net](mailto:janis_crowley@itcareers.net).

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# NetworkWorld

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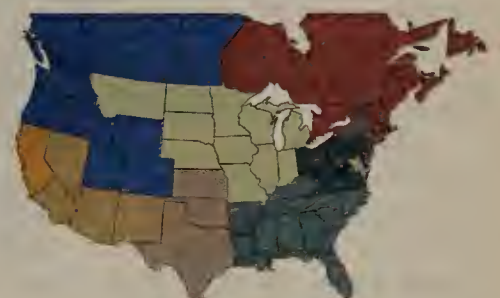
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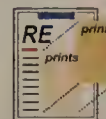


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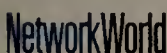
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## Datcenter, continued from page 1

mission-critical enterprise applications.

"There is very little competition between Unix and [Windows] NT once you go beyond four processors," says Ed Martinez, senior systems architect with Prudential Insurance in Newark, N.J. "With Datacenter, we hope to get some flexibility to keep some systems on the Intel platform."

### Encouraged by results

Martinez is encouraged after four months of testing Datacenter and hopes to eventually use it to host databases, consolidate servers, and save on rack space, ports and peripherals.

"We're looking at high-end SQL [database] applications and see some advantage in leveraging more processors and memory per box. Instead of managing lots of servers, we can manage fewer high-end boxes," he says.

Datacenter may be an alternative to Unix in situations when Martinez wants eight or more processors per box, although he has no intention of replacing any of his Unix systems.

The Datacenter operating system, the last piece of the Windows 2000 line to be rolled out, is targeted at high-end databases, server consolidations and hosting environments. Its defining characteristics are support for up to 32 processors, 64G bytes of memory and four-node failover clustering.

Unlike Microsoft's other Windows and NT software, Datacenter will only be available from OEMs, which will configure and test their hardware and the operating system as a single unit as well as offer 24-7 support and guarantees such as 99.9% uptime.

Prudential's Martinez and others, however, are having a hard time evaluating Datacenter because there are no certified applications. "That makes it hard to push it through its paces," Martinez says.

The testing process for validated Datacenter applications began just last month, and not even Microsoft's SQL Server is certified — although it will run on Datacenter.

Given that and the important roles Datacenter would be taking on, Martinez says it will be early next year before Pru-

## Datcenter differences

**Microsoft's Windows 2000 Datacenter server has the same basic features as Microsoft's Advanced Server, but adds technologies designed to handle more intense computing loads.**

Feature	Benefit
Up to 32 processors	Provides greater scalability as long as applications are written to take advantage of multiple processors.
Up to 64G bytes of memory	Improves application performance by allowing more data to be kept in memory; especially beneficial for database applications.
Clustering and load balancing	Clustering provides failover in case a server goes down, while load balancing spreads processing burden over processors.
Process Control Tool	Lets users assign system resources to specific applications and to those resources for optimal performance.

dential even evaluates when and where to introduce the operating system.

"If you don't have the right application, you could be wasting your money on Datacenter," he says.

Others are also taking measured approaches.

"You can count on Unix staying in our Phoenix data center," says Fred Wettling, infrastructure architect for Bechtel, an engineering and construction company in San Francisco. But Wettling says the company may consolidate up to 120 NT servers used for front-end applications, such as those from SAP, and Datacenter could be a candidate for that project. The evaluation process, however, will be long and exhaustive.

It's a process sure to be repeated across many large corporations.

"In order to compete with Unix, Datacenter has to show reliability and scalability," says Tony Iams, an analyst with D.H. Brown and Associates in Port Chester, N.Y.

Hardcore Unix users won't switch to Datacenter, Iams predicts, but he says Microsoft has three key strengths that should be considered by those comparing Datacenter and Unix. They are: price/performance ratio; Datacenter's ability to run across many hardware platforms; and integration of services such as Microsoft's Active Directory.

"Unix still has an advantage with its 64-processor support and 64-bit systems, but the gap has narrowed," Iams says.

Where Datacenter is likely to get immediate traction is with IT executives committed to

Windows but unsatisfied with its performance limitations.

"As we look at databases and data warehousing, we now think the bandwidth and the [operating system] are there to run high-powered PC servers," says Bill Bolt, vice president of IS for Major League Baseball's Arizona Diamondbacks and the National Basketball Association's Phoenix Suns. "We're not a Unix shop today and we don't want to add platforms and spend on training, so we need Microsoft to deliver."

### A different breed

Datacenter is like no other Windows operating system. The processor support, increased memory and clustering improvements are but a handful of its high-powered features. The software includes Process Control Tool, which lets applications be dedicated to certain processors to ensure smooth operation.

There is also network load balancing and WinSock Direct for high-speed communication between applications on the same network.

Features such as those are not strangers to the Unix environment, in which vendors such as Sun and Compaq have offered them for years. The Unix systems also marry operating system software to hardware and back the combination with dedicated support services.

Microsoft's answer is its Datacenter Program, which includes a 14-day stress test OEMs must pass to validate that their hardware is optimized for Datacenter. Any subsequent changes to the hardware are subjected to a

seven-day test. Applications for the platform also must pass a certification test.

The attention to detail will be reflected in Datacenter's price. While the cost will reflect hardware, software and services, an average eight-way system from Datacenter partner Unisys averages about \$174,000. A high-end 32-way server will cost up to \$900,000.

Compaq, Dell, Hewlett-Packard, IBM and Unisys have certified hardware, and six more vendors will be added next week, according to Microsoft. In June, Unisys was the first to demonstrate Datacenter running on a 32-way system.

OEMs also will be required to set up a support center staffed by Microsoft and the OEM's personnel.

In May, Compaq and Microsoft opened a joint support center in Bellevue, Wash.

"The critical part of the Datacenter equation is how you back it up," says Robin Hensley, Datacenter director for Compaq.

As part of that effort, Compaq will oversee updates to the operating system, pushing out configuration changes every six months to its end users.

"There will be no change management done by customers," Hensley says.

Compaq plans to release two Datacenter servers next week — a ProLiant 8500 eight-processor system and a ProLiant 32-processor system. Early next year, Compaq will add a 64-way ProLiant system. ■

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## Mobile, continued from page 8

include strengthening wireless security and automating more management tasks, such as configuring handhelds with applications and authorizing access to network applications and data.

In June, Tivoli rolled out Personalized Services Manager (PSM), primarily designed to give service providers and carriers tools to provision, configure and track voice and data services for wireless users, including users of cell phones that have Web browsers based on the Wireless Application Protocol.

PSM will be integrated into an upcoming set of technologies that will more fully automate the way service providers set up, activate and oversee wireless accounts, says Robert Davis, senior vice president of Tivoli's service provider business group.

Aprisma is creating new software agents that will be downloaded to Windows CE and Palm OS devices, and connect them to Aprisma's server-based Spectrum system. That system is a set of management programs, a central relational database, and Prism, an artificial intelligence "brain" that controls them. Prism will alert administrators about a wireless fault, and drill down to find out whether the fault lies in the wireless LAN network or the handheld.

"The agents will know how to fix certain problems [automatically], without anyone being involved," says Darren Orzechowski, Aprisma's marketing vice president. ■

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Sharleen Smith  
Vice President  
of Convergence  
Oxygen Media



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## DSL, continued from page 1

process include Cisco's Order-to-Service scheme for all-Cisco networks and several new products from broadband order provisioning vendor NightFire. Other vendors are taking the wraps off wares at this week's DSLcon show in Boston.

Also last week, SBC Communications and Covad Communications announced an agreement through which SBC will become a Covad reseller both inside and outside SBC's 13-state home territory. Included in the agreement are network performance guarantees designed to allow Covad to better roll out services in SBC territory.

by the time it's all done, it's six to eight weeks, at least if you go through the competitive providers."

Guglielmo believes the waiting period is shortening and will continue to shorten thanks to new DSL provisioning tools.

"This summer there's been an incredible amount of work in provisioning, qualifying, ordering, getting it all automated and making it easier for ISPs and end users to get DSL orders placed, get their loops qualified and tested, and get everything done as quickly as possible with little need for technicians," he says.

Cisco says its Order-to-Service system can automate the DSL provisioning process end-

large West Coast bank trying to implement a DSLVPN telecommuter network says the integration of back-office systems provided by provisioning tools will help but won't eliminate all ordering delays.

The wires come from the local carrier and are leased to other DSL service providers in a large percentage of cases. The electronic interfaces can make getting the wire quicker, but the customer still has to wait for the other DSL service providers to complete their job. That lag time is independent of the preparation of the local loop, he says.

"We got so sick of waiting for DSL services that we told our end users to go out and get whatever DSL service you want. Then we send them a [VPN] box to secure the connection," the manager says.

DSL providers aren't relying on provisioning tools alone to improve rollouts. Competitive DSL providers and ILECs are forging tighter relationships to allow them to improve their service offerings.

Covad's deal with SBC last week should allow SBC to become a bigger name in DSL business service. SBC will now resell Covad's business-class symmetric DSL services and also take a \$150 million, 6% stake in Covad.

Covad also gets a commitment of \$600 million in resale revenue from SBC over six years and performance guarantees that set limits on how long SBC can take to provision DSL lines for Covad. The companies have also resolved a series of outstanding legal issues.

"This agreement allows us to continue competing with SBC and serve our customers better," says Dhruv Khanna, Covad's executive vice president and general counsel.

The Covad/SBC deal comes about a month after Verizon announced it was taking a 55% stake in DSL provider NorthPoint. The third-largest national DSL provider, Rhythms, has yet to announce a major ILEC relationship.

TeleChoice's Guglielmo notes Rhythms had more cash on hand than Covad or NorthPoint and can probably survive on its own for some time. If Rhythms forms a relationship with a large carrier, Guglielmo anticipates it would be with MCI, which has a large stake in Rhythms. ■

## Incye, continued from page 1

treat ailments and afflictions.

"We were one of the large players doing a lot of the decoding," says Phil Kwan, associate director of network infrastructure at Incyte Genomics. "We believe [the human genome] should be completely uncovered and be made available to everybody to start using this information to produce a better drug."

Incyte's network transports between 6 and 8.5 terabytes of data daily in a configuration that supports multigigabit links between switches. The network consists of 88 Foundry Networks routers and switches with 2,000 10/100M bit/sec Layer 2 Ethernet ports and up to 560 Gigabit Ethernet ports. Between 150 and 200 of the Gigabit Ethernet ports are fully routed using Open Shortest Path First.

The Foundry switches support high-speed access and data retrieval to and from a 1,200- to 1,300-strong server farm, which includes one of the biggest Linux farms in the world, with 850 to 900 Linux machines in clusters, Kwan says.

Incyte also has 350 to 400 Sun, Silicon Graphics and Digital Equipment servers, as well as 75 to 100 Windows NT servers and a smattering of Apple Macintoshes.

All links and devices in the Incyte network are redundant.

Gigabit links are logically grouped into multigigabit trunks using Foundry's multi-link trunking feature and IP load balancing. The smallest multi-link trunk is 2G bit/sec, and the largest is between 6G and 8G bit/sec.

This configuration not only ensures reliability, but also balances loads across multiple paths for better performance, Kwan says.

"Because of this design, we haven't had a network outage that's affected the backbone for over three years," he says. "The design helped a lot, the OSPF helped a lot, but also the gigabit redundancy really did its job."

Applications on the network perform sequencing, raw data analysis, high-volume data transfers, and product and software development. Application quality of service (QoS) is based on some unsophisticated queuing, Kwan says. The network supports two or three levels of

priority with the high-bandwidth servers having the highest-priority QoS, he says.

Once the information is sequenced, it gets put into a database that is sold to large pharmaceutical companies for target drug research. Some of this data is also available freely for the genome project work.

Incyte last month licensed its database and gene-patent portfolio to Motorola so that the company could develop "biochips" that contain data on biological samples of genes.

Incyte has been sequencing genetic information for about four years. Initially, its network was based on 100M bit/sec Fast Ethernet and FDDI.

The firm began its upgrade to Gigabit Ethernet three years ago to keep its network from collapsing under the weight of the bandwidth-intensive sequencing data.

"One terabyte to 1.5 terabytes of information was being pushed around three and a half years ago, and our older legacy network was buckling an average of three to four times per month," Kwan says. "Too much traffic was congesting the backplanes of our switches and routers."

Routing topology updates would trigger management modules on Incyte's switches and routers to shut down transmission of that information during network rediscovery. That shutdown would cause a lot of the sessions on Incyte's Unix server farm to hang or to die, Kwan says.

"That was a very costly adventure," he says.

Incyte upgraded to Gigabit Ethernet after a long study comparing that technology with others, namely ATM and High-Performance Parallel Interface (HIPPI). The high cost of ATM and the limited vendor support for HIPPI convinced Incyte to go Gigabit Ethernet.

"We decided Gigabit Ethernet looked like a very positive upcoming standard because so many vendors were behind it," Kwan says. "Three and a half years ago, ATM was very costly. We couldn't achieve the benefits down to the server farm unless we put all of our servers on ATM. ■"

## Simplifying DSL rollouts

**Cisco's Order-to-Service limits human error by automating the steps that are necessary to turn up DSL services:**

- 1 A customer's DSL order is entered electronically and triggers an automatic lookup of whether the customer's phone line can handle the service.



- 3 Software shipped to the user configures the customer's PC and the new customer is entered into the carrier's database for billing purposes.

- 2 Software in the carrier network provisions network gear to support DSL on the customer's line.

Much of the delay in rolling out DSL services has been attributed to the lack of a seamless fulfillment process between DSL providers, such as Covad, NorthPoint and Rhythms, and ILECs, which own the copper loops over which DSL service runs. When a DSL provider, or one of its resellers, receives a DSL order, the order is sent to an ILEC, which has to ensure that the local loop for the order is qualified to handle DSL.

Once the loop has been qualified, an ILEC technician will schedule a visit to the order site to do inside wiring. Finally, a technician from the competitive DSL provider will schedule a visit to configure the end user's computer and modem.

"Getting through all these steps takes several days each," says Adam Guglielmo, an analyst with consultancy TeleChoice in Denver. "By the time they coordinate with you and

to-end for service providers that have all-Cisco networks. Order-to-Service consists of several software components, including Cisco Network Order Manager, Quintessent's DSLXchange, Turnstone's Copper CrossConnect CX100 and CrossWorks Back Office Automation Software, BroadJump's Virtual Truck Installer and Portal's Infranet (see graphic).

Craig Johnson, a principal with The Pita Group technology analysis firm in Portland, Ore., says the Cisco plan is good but more is needed.

"We're still in the first or second inning of providing the tools necessary to provision DSL that are comparable to what the old phone system has for provisioning voice services," Johnson says. "We need a mechanism where you do a submittal, get approval and all the rest without getting 50 people involved."

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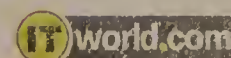
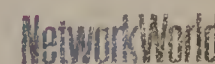
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## Pain from the knee and the Jukebox

aving just had knee surgery, I was cheered to find a new toy waiting for me Monday morning. It was the Creative Nomad Jukebox from Creative Labs, the people who made the SoundBlaster an industry standard.

I first saw the Nomad Jukebox at the Internet World Show in Los Angeles in April and was blown away. One hundred hours of music (it uses a tiny hard disk drive) in something the size of a regular portable CD player? Wow!

For anyone like me who relies on music to make airplane trips tolerable, this could be the best thing since the Sony Discman. And to plug the thing into my car stereo — heaven! The price was around \$400, and if you ordered at the show you got into the queue for shipments that were due to start in three months.

Well, the months went by and no product and no word from Creative. I (and thousands of other test pilots) started wondering what was going on. So when I hobbled out to my office on Monday and found the product waiting, I was excited.

My first surprise was that the Nomad Jukebox has special NiMH batteries made by Creative, and the product comes with dire warnings about using any other batteries. But it was the 9-hour charge time that was a bit disappointing. No matter. I put in the batteries, plugged in the power adapter and switched it on.

The sound is terrific! Lots of control of playlists, tone, spatialization — a geek audiophile's dream toy. I installed the software on a PC, connected the Universal Serial Bus cable and discovered the first oddity: I couldn't copy the music already on the device to the PC. I suspect it was somehow "locked" for copyright reasons. This could turn out to be a problem for other users, as subsequent events will show. . . .

I started to download some MP3 files, and the Jukebox suddenly complained that the operation couldn't be performed, as the

batteries didn't have enough power, even though the adapter was still plugged in.

Thinking that the Jukebox must be confused because the batteries were in, I unplugged the adapter, took the batteries out and plugged the adapter back in. The Jukebox booted and then sat there for 10 minutes claiming it was "Preparing Library." In the manual it says this means the Jukebox has stopped responding (duh) and if resetting fails, call tech support. When I called the tech support number given in the product literature, the awful interactive voice response system makes (surprise!) absolutely no reference to the Jukebox!

After chasing through customer service for the real tech support number, I finally got a human being who knew nothing about the product but was determined in a lackluster sort of way to help me. This help consisted of doing several times exactly what I had already done according to the manual. She also had me try to reformat the Jukebox but couldn't begin to explain how I would restore the music that was apparently locked on the disk (obviously this was all completely new territory to her).

When we finally came to the staggeringly obvious conclusion that the thing had died, she arranged a replacement and I spoke to her supervisor. I told him that I had just spent 90 minutes getting unbelievably lame support on a brand-new product. He apologized and freely admitted that they hadn't seen the product until a few days earlier.

Houston, I think we have a problem . . . and I think I can safely say that the product was released before it was ready and before the company was ready to service and support it. Idiots.

When I can hobble to FedEx to have the old one sent out and I get the replacement, and if it works, I will pass it on to Gearhead for consideration. Until then, this is Hopalong Gibbs signing off and waiting for the next spot of cheer. I am not optimistic.

Get creative at [nwcolumn@gibbs.com](mailto:nwcolumn@gibbs.com).



MARK  
GIBBS



The latest on the  
Internet industry

**Who would have thought** warm-and-fuzzy **Apple Computer** could be cast as the corporate bully?

How about the folks at what used to be known as **AppleSoup, Inc.**?

Poised to launch a peer-to-peer file-sharing business, the start-up found itself in hot bouillabaisse recently when Apple sent a cease-and-desist demand alleging that the name AppleSoup is no orange when compared to the Mac maker's famous moniker.

AppleSoup judged surrender the better part of valor and last week renamed the company **FlyCode**, which is supposed to embody the spirit of . . . aw, these explanations never make sense, so why bother?

Apple's muscle flexing did this fledgling company a favor on two scores: You can't buy the kind of publicity these David vs. Goliath spats inevitably generate, and FlyCode is a cooler name than the utterly unappetizing AppleSoup.

Of course, you have to feel sorry for Internet entrepreneurs these days, because when it comes time to name their baby, all the best choices are already online, locked up or viewed as a birthright by some corporate behemoth.

Witness **Model E Corp.**, a start-up profiled here last month that intends to sell custom-designed cars over the Internet. **Ford Motor Co.** didn't take kindly to the newcomer's twist on Ford's famous Model T, alleging in court papers that the Model E name was likely to confuse those who buy Model T antiques.

David dropped Goliath this time, too, as a Michigan court dismissed Ford's complaint.

Ironically, Ford has a much-publicized internal program for providing its massive workforce with home PCs and broadband connections. The name of the program is . . . Model E.

My guess is Model E Corp. won't press its luck by suing Ford.

**John Cullinane's Mogall.com** — an online resource for the kind of networking that used to require a Rolodex — was described here July 3 as being "a little squishy."

Well, last week Mogall.com got squashed, as Cullinane pulled the plug on a venture he backed with \$2 million of his money and a reputation for making technology profitable. Cullinane made his name by founding **Cullinet Software**, which in 1978 became the first software company to go public and later was the first to boast a \$1 billion valuation.

So it's not just pimply college kids flying these dot-coms into the dirt.

**Advertising is a necessity** and a cash-flow challenge for e-commerce start-ups, so it's difficult to poke fun at any company for stooping to "creative marketing."

Good thing Buzz never shies from the difficult, because this next bit of creativity from **Zappos.com** — an online shoe store — will leave the most brazen marketer slack-jawed.

"You have been randomly selected to have the **opportunity** for your name to appear in our first national print advertising campaign," writes **Zappos.com CEO Nick Swinmurn** in an e-mail whose recipients included Deidra Massenberg, *Network World's* crackerjack editorial researcher.

"Our first full-page, national ad will run in *USA Today*," the letter continues. "If you choose to pay the **\$35 production fee**, your name will appear in print next to 3,000 other names, along with your answer to the following question: What's your favorite brand of shoe?"

Let's see: 3,000 names at \$35 a pop? . . . That's \$105,000.

*USA Today* tells me a full-page ad costs \$103,000.

But are there really 3,000 shoe buyers *that* desperate to see their names in agate type? Can't say for certain, since Swinmurn didn't return my call or answer my e-mail. But a notice on the Zappos Web site says the company is "no longer taking any new applications" for the ad.

Whether the scam worked or not, you've got to admire the gall.

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